Vol. 8, No. 22
November 30, 1983

Energy Research Abstracts

Abstracts 53334-55348

Technical Information Center
UNITED STATES DEPARTMENT OF ENERGY

CURRENT AWARENESS PUBLICATIONS ON ENERGY

To provide complete coverage of literature related to major Department programs, announcement publications that are comprehensive in their coverage of certain energy fields are issued regularly. All information in these publications, plus additional backup information, is included in the Energy Data Base of the Technical Information Center; all references are also available for machine searching via the on-line retrieval system, DOE/RECON, and the commercial on-line retrieval systems. Descriptions of these current awareness publications, which are supported either directly or indirectly by the DOE, appear below. Department of Energy components may receive the listed publications free from the Technical Information Center, P.O. Box 62, Oak Ridge, TN 37830. Telephone (615) 576-1303; (FTS) 626-1303.

PUBLICATIONS OF THE TECHNICAL INFORMATION CENTER

Energy Abstracts for Policy Analysis (EAPA)

A monthly abstract journal devoted to the analysis of energy research, conservation, and policy. Scope and coverage are limited to substantive articles or reports and emphasize the following: programmatic efforts; legislative, regulatory, and other legal aspects; social, economic, and environmental impacts; regional and sectoral analyses; institutional factors, etc. *EAPA* is available from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402; domestic subscribers $6.00, foreign $7.50 per copy; annual cumulative index, domestic $10.00, foreign $12.50 per copy. The annual subscription price is $70.00 for domestic subscribers and $87.50 for foreign subscribers.

Energy Research Abstracts (ERA)

A comprehensive semimonthly abstract journal devoted to all areas of energy-related information produced by the Department of Energy, other U. S. government organizations, and foreign governments. *ERA* is available to the public on a subscription basis from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. The subscription rate for the 24 semimonthly issues is $165.00 for domestic subscribers and $206.25 for foreign subscribers. A single issue costs $9.50 (domestic) or $11.90 (foreign).

The following publications are available to the public on a subscription basis from the National Technical Information Service (NTIS), Springfield, Virginia 22161. The annual subscription rate for one volume (calendar) year (12 issues plus cumulative index) is $75.00 for domestic subscribers and $150.00 for subscribers outside the North American continent, except as listed below for *DOE Patents Available for Licensing (PAL)*. A single issue is $7.00 (domestic) and $14.00 (outside the North American continent).

Current Energy Patents (CEP)

A monthly publication providing abstracting and indexing coverage of the international patent literature, including patent applications, that concerns any aspect of energy production, conservation, and utilization. Available as PB83-902800.

DOE Patents Available for Licensing (PAL)

DOE is prepared to grant exclusive or nonexclusive, revocable licenses under DOE-owned U. S. patents and patent applications; this semiannual publication provides abstracting and indexing coverage to this literature. Available as PB83-946800; the annual subscription price is $14.00 (domestic) and $28.00 (foreign).

Energy and the Environment (EAE)

A monthly abstract journal devoted to information on the impacts of energy-related activities and radioactive and nonradioactive pollutants on the environment. Available as PB83-914900.

Fossil Energy Update (FEU)

A monthly abstract journal devoted to information on the processing and use of fossil fuels. Available as PB83-914600.

Fusion Energy Update (CFU)

A monthly abstract journal devoted to information on controlled thermonuclear research. Available as PB83-915300.

Solar Energy Update (SEU)

A monthly abstract journal devoted to information on the utilization of solar energy, including biomass and tidal and wind power. Available as PB83-914500.

The following publications are available from the National Technical Information Service (NTIS), Springfield, Virginia 22161. The annual rate for one volume (calendar) year (24 issues) is $40.00 for domestic subscribers and $80.00 for subscribers outside the North American continent.

Direct Energy Conversion (DEC)

A semimonthly current awareness bulletin covering the following areas: photovoltaics, magnetohydrodynamics, electrohydrodynamics, thermoelectrics, thermionics, and fuel cells. Available as PB83-946600.

Geothermal Energy Technology (GET)

A semimonthly current awareness bulletin devoted to information on the exploration and development of geothermal resources. Available as PB83-914700.

Nuclear Fuel Cycle (NFC)

A semimonthly current awareness bulletin covering all aspects of the nuclear fuel cycle, both front end and back end. Available as PB83-913400.

Nuclear Reactor Safety (NRS)

A semimonthly current awareness bulletin covering the following safety aspects: accident analysis, safety systems, radiation protection, decommissioning and dismantling, and security measures. Available as PB83-913500.

Radioactive Waste Management (RWM)

A semimonthly current awareness bulletin covering the following management aspects: transport and storage, waste processing, waste disposal, waste storage, radioactive effluents, and shipping containers. Available as PB83-902900.

INTERNATIONAL ENERGY PUBLICATIONS

The Technical Information Center cooperates with the following organizations in the publication of international abstract journals: (1) International Atomic Energy Agency, International Nuclear Information System, Vienna, Austria, for *Atomindex;* (2) International Energy Agency, IEA Coal Research, London, England, for *Coal Abstracts;* and (3) International Energy Agency, Biomass Conversion Technical Information Service, Dublin, Ireland, for *Biomass Abstracts*. In each case, the cognizant foreign agency provides the non-U.S. information to TIC for inclusion in the Energy Data Base; in turn, TIC provides the U.S. information for input into the respective journal.

Atomindex

A semimonthly abstract journal providing worldwide coverage of information on nuclear science and technology. *Atomindex* is available by subscription from UNIPUB, 345 Park Avenue South, New York, NY 10010. The cost of an annual subscription, 24 semimonthly issues and semiannual and annual cumulative indexes, is $290.

Biomass Abstracts

A bimonthly abstract journal with comprehensive coverage of information in any step involved in the eventual conversion of biomass to energy. *Biomass Abstracts* is available free to Department of Energy components and contractors from the Technical Information Center. Non-DOE organizations may obtain *Biomass Abstracts* from Biomass Conversion Technical Information Service, Institute for Industrial Research and Standards, Ballymun Road, Dublin 9, Ireland, for 42 IR pounds per year. Make checks payable to the Institute.

Coal Abstracts

A monthly abstract journal providing comprehensive worldwide coverage of information in the field of coal science and technology. *Coal Abstracts* is available to Department of Energy components and contractors from the Technical Information Center. Non-DOE organizations may obtain *Coal Abstracts* from IEA Coal Research, Technical Information Service, 14-15 Lower Grosvenor Place, London SW1W 0EX, England, for 100 pounds sterling per year.

International Copyright, © U. S. Department of Energy, 1983, under the provisions of the Universal Copyright Convention. United States copyright is not asserted under the United States Copyright Law, Title 17, United States Code.

energinfo ERA

Vol. 8, No. 22
ISSN: 0160-3604
CODEN: ERABD
November 30, 1983

ENERGY RESEARCH ABSTRACTS

ABOUT THE TECHNICAL INFORMATION CENTER

The Technical Information Center in Oak Ridge, Tennessee, has been the national center for scientific and technical information for the Department of Energy (DOE) and its predecessor agencies since 1946. In developing and managing DOE's technical information program, the Center places under bibliographic control not only DOE-originated information but also worldwide literature on scientific and technical advances in the energy field and announces the source and availability of this information. Whereas the literature of science is emphasized, coverage is extended to DOE programmatic, socioeconomic, environmental, legislative/regulatory, energy analysis, and policy-related areas. To accomplish this mission, the Center builds and maintains computerized energy-information data bases and disseminates this information via computerized retrieval systems and announcement publications such as abstracting journals, bibliographies, and update journals. Direct access to the Center's most comprehensive data base, the Energy Data Base, is available to the public through commercial on-line bibliographic retrieval systems. The Energy Data Base and many of the Center's energy-related data bases are available to DOE offices and contractors and to other government agencies via DOE/RECON, the Department's on-line information retrieval system. The Center has developed and maintains systems to record and communicate energy-related research-in-progress information, to maintain a register of DOE public communications publications, to track research report deliverables from DOE contractors, and to test and make available DOE-funded computer software programs with scientific and management applications. The Center also maintains a full-scale publishing capability to serve special publication needs of the Department. To effectively manage DOE's technical information resources, the Center's program is one of continual development and evaluation of new information products, systems, and technologies.

UNITED STATES DEPARTMENT OF ENERGY

Donald Paul Hodel
Secretary

Martha O. Hesse
Assistant Secretary
Management and Administration

William S. Heffelfinger
Director of Administration

Joseph G. Coyne
Manager
Technical Information Center

ABOUT *ENERGY RESEARCH ABSTRACTS*

Energy Research Abstracts (ERA) provides abstracting and indexing coverage of all scientific and technical reports, journal articles, conference papers and proceedings, books, patents, theses, and monographs originated by the U. S. Department of Energy, its laboratories, energy centers and contractors. *ERA* also covers other energy information prepared *in report form* by federal and state government organizations, foreign governments, and domestic and foreign universities and research organizations. The user should remain aware that *ERA* coverage of non-report literature is limited to that generated by Department of Energy activity.

ERA is comprehensive in its subject scope, encompassing the DOE's research, development, demonstration, and technological programs resulting from its broad charter for energy sources, supplies, safety, environmental impacts, and regulation.

ERA is available on an exchange basis to universities, research institutions, industrial firms, and publishers of scientific information. Inquiries should be directed to the Technical Information Center, P. O. Box 62, Oak Ridge, Tennessee 37830.

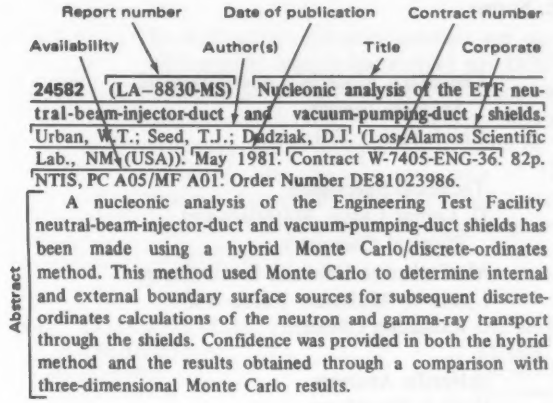
ERA is available to the public on a subscription basis from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. The subscription rate for the 24 semimonthly issues is $165.00 for domestic subscribers and $206.25 for foreign subscribers. A single issue costs $9.50 (domestic) or $11.90 (foreign). The cumulative indexes will be available in printed form from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402, and in microfiche form from the National Technical Information Service, U. S. Department of Commerce, Springfield, Virginia 22161, and from Engineered Systems, P. O. Box 866, Oak Ridge, Tennessee 37830.

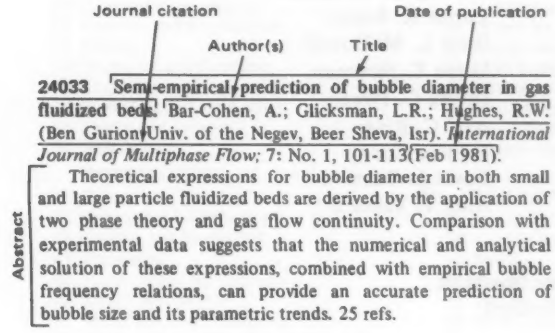
Published by the **United States Department of Energy, Technical Information Center**
P. O. Box 62, Oak Ridge, Tennessee 37830

HOW TO USE *ENERGY RESEARCH ABSTRACTS*

ABSTRACTS IN *ENERGY RESEARCH ABSTRACTS*

The principal elements of abstract entries for a typical research and development report and a typical technical journal article are illustrated below.


Report number
Date of publication
Contract number
Availability
Author(s)
Title
Corporate
24582 (LA–8830-MS) Nucleonic analysis of the ETF neutral-beam-injector-duct and vacuum-pumping-duct shields. Urban, W.T.; Seed, T.J.; Dudziak, D.J. (Los Alamos Scientific Lab., NM (USA)). May 1981. Contract W-7405-ENG-36. 82p. NTIS, PC A05/MF A01. Order Number DE81023986.
Abstract
A nucleonic analysis of the Engineering Test Facility neutral-beam-injector-duct and vacuum-pumping-duct shields has been made using a hybrid Monte Carlo/discrete-ordinates method. This method used Monte Carlo to determine internal and external boundary surface sources for subsequent discrete-ordinates calculations of the neutron and gamma-ray transport through the shields. Confidence was provided in both the hybrid method and the results obtained through a comparison with three-dimensional Monte Carlo results.


Journal citation
Date of publication
Author(s)
Title
24033 Semi-empirical prediction of bubble diameter in gas fluidized beds. Bar-Cohen, A.; Glicksman, L.R.; Hughes, R.W. (Ben Gurion Univ. of the Negev, Beer Sheva, Isr). International Journal of Multiphase Flow; 7: No. 1, 101-113 (Feb 1981).
Abstract
Theoretical expressions for bubble diameter in both small and large particle fluidized beds are derived by the application of two phase theory and gas flow continuity. Comparison with experimental data suggests that the numerical and analytical solution of these expressions, combined with empirical bubble frequency relations, can provide an accurate prediction of bubble size and its parametric trends. 25 refs.

INDEXES TO *ENERGY RESEARCH ABSTRACTS*

Five indexes are provided for approaching the contents of each issue of *Energy Research Abstracts (ERA)*. Each index is preceded by an introduction that details the organization of the index and the principles by which it was compiled. The reader is referred to these introductions for information not found in the index examples that follow.

• Corporate Author Index

Technical report literature is indexed using the name of the organization or institution responsible for the issuance of the report.

24582 (LA–8830-MS) Nucleonic analysis of the ETF neutral-beam-injector-duct and vacuum-pumping-duct shields. Urban, W.T.; Seed, T.J.; Dudziak, D.J. **(Los Alamos Scientific Lab., NM (USA)).** May 1981. Contract W-7405-ENG-36. 82p. NTIS, PC A05/MF A01. Order Number DE81023986.

is indexed as:

Los Alamos Scientific Lab., NM (USA)
Nucleonic analysis of the ETF neutral-beam-injector-duct and vacuum-pumping-duct shields, 6:24582 (R:US)

• Personal Author Index

Each author's name is indexed in the form appearing on the document abstracted, with the exception that given names are reduced to initials:

Bar-Cohen, A., Semi-empirical prediction of bubble diameter in gas fluidized beds, 7:24033 (J:US)
Dudziak, D.J., *See* Urban, W.T., 6:24582
Glicksman, L.R., *See* Bar-Cohen, A., 7:24033
Hughes, R.W., *See* Bar-Cohen, A., 7:24033
Seed, T.J., *See* Urban, W.T., 6:24582
Urban, W.T., Nucleonic analysis of the ETF neutral-beam-injector-duct and vacuum-pumping-duct shields, 6:24582 (R:US)

• Subject Index

The subject index consisting of entries naming specific materials, objects, and processes is arranged alphabetically. Document titles, informative phrases, or both specific to these entries are arranged alphabetically under the entries.

TOKAMAK ETF
Neutral Atom Beam Injection
Nucleonic analysis of the ETF neutral-beam-injector-duct and vacuum-pumping-duct shields, 6:24582 (R:US)
Neutron Transport
Nucleonic analysis of the ETF neutral-beam-injector-duct and vacuum-pumping-duct shields, 6:24582 (R:US)

• Contract Number Index

DOE technical literature is indexed using contract numbers under which the literature was produced. This index contains the contract number with corresponding abstract and report numbers.

W-7405-ENG-36	**Los Alamos National Lab., NM (USA)**	
	6:24582	LA–8830-MS

• Report Number Index

Technical report literature is also indexed using report numbers. This index includes information on where individual reports may be obtained. Patents and conference papers are indexed here as a matter of convenience. When a report is supplied under an Order Number, that number is included in the availability statement. An Order Number–Report Number Correlation is included for convenience.

LA–		
8830-MS	**6:24582**	**NTIS, PC A05/MF A01. Order Number DE81023986, Distribution Category STD-20d**

STAFF OF ENERGY RESEARCH ABSTRACTS

Editor
David E. Bost

Assistant Editors
Lee M. Thompson
Charles E. Stuber

Nuclear, Engineering, and Physics Research Branch
Chief, Henry D. Raleigh

Technical Specialists
David C. Cunningham, Nuclear Engineering
William H. Kinser, Jr., Physics
Lila Smith, Solar Energy
Lawrence T. Whitehead, Nuclear Physics
Milton O. Whitson, Fusion Energy

Scientific Analysts
Sharon Colclasure
Donald D. Davis
James R. Dulaney
Michael J. Joncich
Dona C. Keller
Mona H. Raridon
George H. Thoeming
Jerry M. Thomas
Larry E. Williams

Chemistry, Materials, and Biological Sciences Branch
Chief, Sidney F. Lanier

Technical Specialists
D. Lamar Cason, Materials and Physical Chemistry
M. Catherine Grissom, Fossil Energy
Lynda H. McLaren, Radio- and Radiation Chemistry

Scientific Analysts
Polly S. Blackburn
Dorothy M. Chertok
Carole K. Keyes
Betty L. McDowell
Lorne T. Newman
Donna G. Powers
Axel C. Ringe
Frances Roddy
David L. Snow
Amy T. Tamura

Subject Heading Specialist
Julia S. Redford

Corporate Author Specialist
Patsy L. Hendricks

Report Number Specialist
Ramona N. Nelson

Contract Number Specialist
William D. Matheny

Cataloging/Digitizing Coordinator
Mary C. Hall

Computer Processing Coordinator
Billy H. Brady

Publishing Coordinator
Irene D. Keller

Communication concerning the editorial policy and content of *Energy Research Abstracts* should be addressed to the Editor, *Energy Research Abstracts*, Technical Information Center, P. O. Box 62, Oak Ridge, Tennessee 37830.

SUBJECT CONTENTS (NUMERICAL LISTING)

Six-digit subject category numbers are used in the storage, retrieval, and manipulation of bibliographic information entered into DOE's computerized bibliographic information system. The six-digit category numbers are utilized as if they were three pairs of two-digit numbers, the first two pairs being used to arrange the abstract content of *Energy Research Abstracts.* The following listing includes the totality of the 40 first-level and 294 second-level subject categories used. Because each issue of *ERA* announces only those documents becoming available during a semimonthly period, some subject categories may not be represented in every issue. The complete subject category scheme with scope notes is available as DOE/TIC-4584-R4 from NTIS for $7.00.

01 COAL AND COAL PRODUCTS
- 04 Processing
- 05 By-Products
- 06 Properties
- 08 Waste Management
- 09 Environmental Aspects
- 10 Reserves and Exploration
- 20 Mining
- 30 Transport and Handling
- 40 Combustion
- 50 Marketing and Economics
- 60 Health and Safety
- 70 Regulations

02 PETROLEUM
- 01 Reserves
- 02 Geology and Exploration
- 03 Drilling and Production
- 04 Processing
- 05 Products and By-Products
- 06 Health and Safety
- 07 Marketing and Economics
- 08 Waste Management
- 09 Environmental Aspects
- 10 Policy, Legislation, and Regulation
- 20 Transport, Pipelines, and Handling
- 30 Properties
- 40 Storage
- 50 Combustion

03 NATURAL GAS
- 01 Reserves
- 02 Geology and Exploration
- 03 Drilling, Production, and Processing
- 04 Products and By-Products
- 05 Health and Safety
- 06 Marketing and Economics
- 07 Waste Management
- 08 Environmental Effects
- 09 Artificial Stimulation, Plowshare, etc.
- 10 Policy, Legislation, and Regulation
- 20 Transport, Pipelines, and Handling
- 30 Properties
- 40 Combustion
- 50 Storage

04 OIL SHALES AND TAR SANDS
- 01 Reserves and Exploration
- 02 Site Geology and Hydrology
- 03 Drilling, Fracturing, and Mining
- 04 Oil Production, Recovery, and Refining
- 05 Properties and Composition
- 06 Direct Uses and By-Products
- 07 Health and Safety
- 08 Marketing and Economics
- 09 Waste Research and Management
- 10 Environmental Aspects
- 20 Regulations

05 NUCLEAR FUELS
- 01 Reserves
- 02 Exploration
- 03 Mining
- 04 Feed Processing
- 05 Enrichment
- 06 By-Products
- 07 Fuels Production and Properties
- 08 Spent Fuels Reprocessing
- 09 Transport and Storage
- 10 Marketing and Economics
- 20 Waste Management
- 30 Environmental Aspects
- 40 Health and Safety
- 50 Regulations

06 FUSION FUELS
- 01 Sources
- 02 Processing
- 03 By-Products
- 04 Transport and Storage
- 05 Health and Safety
- 06 Regulations and Policy
- 07 Waste Management
- 08 Properties
- 09 Environmental Aspects

07 ISOTOPE AND RADIATION SOURCE TECHNOLOGY
- 01 Physical Isotope Separation
- 02 Radiation Sources
- 03 Isotopic Power Supplies

08 HYDROGEN
- 01 Production
- 02 Storage
- 03 Transport
- 04 Marketing and Economics
- 05 Safety
- 06 Industrial and Commercial Use
- 07 By-Products
- 08 Properties
- 09 Environmental Aspects

09 OTHER SYNTHETIC AND NATURAL FUELS
- 01 Hydrocarbon Fuels
- 02 Alcohol Fuels
- 03 Inorganic Hydrogen Compound Fuels
- 04 Solid Waste Fuels
- 05 Liquid Waste Fuels
- 06 Gaseous Waste Fuels

13 HYDRO ENERGY
- 01 Resources and Availability
- 02 Site Geology and Meteorology
- 03 Plant Design and Operation
- 04 Regulations and Licensing
- 05 Economics and Management
- 06 Environmental Aspects
- 07 Power Conversion Systems

14 SOLAR ENERGY
- 01 Resources and Availability
- 03 Economics
- 04 Environmental, Legal, and Institutional Aspects
- 05 Solar Energy Conversion
- 06 Photovoltaic Power Plants
- 07 Solar Thermal Power Plants
- 08 Ocean Thermal Gradient Power Plants
- 09 Solar Radiation Utilization
- 10 Solar Collectors and Concentrators
- 20 Heat Storage

15 GEOTHERMAL ENERGY
- 01 Resource Status and Assessment
- 02 Geology, Hydrology, and Geothermal Systems
- 03 Geothermal Exploration and Exploration Technology
- 04 Legal and Institutional Aspects

15 GEOTHERMAL ENERGY (CONT.)
- 05 Economic and Financial Aspects
- 06 Environmental Aspects and Waste Disposal
- 07 By-Products
- 08 Geothermal Power Plants
- 09 Geothermal Engineering
- 10 Direct Energy Utilization
- 20 Geothermal Data and Theory

16 TIDAL POWER
- 03 Regulations
- 04 Economics
- 05 Environmental Aspects
- 07 Tidal Power Plants
- 08 Wave Energy Converters

17 WIND ENERGY
- 01 Availability (Climatology)
- 03 Regulations
- 04 Economics
- 05 Environmental Aspects
- 06 Wind Energy Engineering

20 ELECTRIC POWER ENGINEERING
- 01 Power Plants and Power Generation
- 02 Environmental Aspects
- 03 Power Transmission and Distribution

21 NUCLEAR POWER PLANTS
- 01 Power Reactors, Non-Breeding, Light-Water Moderated, Boiling Water Cooled
- 02 Power Reactors, Non-Breeding, Light-Water Moderated, Non-Boiling Water Cooled
- 03 Power Reactors, Non-Breeding, Graphite Moderated
- 04 Power Reactors, Non-Breeding, Otherwise Moderated or Unmoderated
- 05 Power Reactors, Breeding
- 06 Power Reactors, Auxiliary, Mobile, Package, and Transportable
- 07 Regulation and Licensing
- 08 Economics
- 09 Process Heat Reactors

22 NUCLEAR REACTOR TECHNOLOGY
- 01 Theory and Calculation
- 02 Components and Accessories
- 03 Fuel Elements
- 04 Control Systems
- 05 Environmental Aspects
- 06 Research, Test, and Experimental Reactors
- 07 Plutonium and Isotope Production Reactors
- 08 Propulsion Reactors
- 09 Reactor Safety

25 ENERGY STORAGE
- 01 Magnetic
- 02 Compressed Gas
- 03 Pumped Hydro
- 04 Capacitor Banks
- 05 Flywheels
- 06 Thermal
- 07 Liquefied Gas
- 08 Chemical
- 09 Batteries

29 ENERGY PLANNING AND POLICY
- 01 Energy Analysis and Modeling
- 02 Economics and Sociology
- 03 Environment, Health, and Safety
- 04 Natural Resources
- 05 Research, Development, Demonstration, and Commercialization
- 06 Nuclear Energy
- 07 Transport and Storage
- 08 Waste Heat Utilization
- 10 Conservation
- 20 Supply, Demand, and Forecasting
- 30 Policy, Legislation, and Regulation
- 40 Fossil Fuels
- 50 Hydrogen and Synthetic Fuels
- 60 Electric Power
- 80 Consumption and Utilization
- 90 Unconventional Sources and Power Generation

30 ENERGY CONVERSION
- 01 MHD Generators
- 02 EHD Generators
- 03 Thermoelectric Generators
- 04 Thermionic Converters
- 05 Fuel Cells
- 08 Electromechanical Converters

32 ENERGY CONSERVATION, CONSUMPTION, AND UTILIZATION
- 01 Buildings
- 02 Transportation
- 03 Industry and Agriculture
- 06 Municipalities and Community Systems
- 09 Education and Public Relations

33 ADVANCED AUTOMOTIVE PROPULSION SYSTEMS
- 01 Internal Combustion Engines
- 02 External Combustion Engines
- 03 Electric-Powered Systems
- 04 Hybrid Systems
- 05 Flywheel Propulsion
- 06 Vehicle Design Factors
- 07 Emission Control
- 08 Alternative Fuels

36 MATERIALS
- 01 Metals and Alloys
- 02 Ceramics, Cermets, and Refractories
- 03 Composite Materials
- 04 Polymers and Plastics
- 06 Other Materials

40 CHEMISTRY
- 01 Analytical and Separations Chemistry
- 02 Inorganic and Physical Chemistry
- 03 Organic Chemistry
- 04 Electrochemistry
- 05 Photochemistry
- 06 Radiation Chemistry
- 07 Radiochemistry and Nuclear Chemistry
- 08 Combustion Chemistry

42 ENGINEERING
- 01 General Engineering
- 02 Facilities and Equipment
- 03 Lasers
- 04 Heat Transfer and Fluid Flow
- 05 Materials Testing

42 ENGINEERING (CONT.)
- 06 Safety Engineering
- 07 Vacuum Engineering
- 08 Electronic Circuits and Devices
- 09 Waste Processing Plants and Equipment
- 10 Combustion Systems
- 20 Underground Engineering
- 30 Marine Engineering
- 40 Pollution Control Equipment
- 50 Power Cycles

43 PARTICLE ACCELERATORS
- 01 Design, Development, and Operation
- 02 Beam Dynamics, Field Calculations, and Ion Optics
- 03 Auxiliaries and Components
- 04 Storage Rings

44 INSTRUMENTATION
- 01 Radiation Instrumentation
- 02 Radiation Effects on Instrument Components, Instruments, or Electronic Systems
- 03 Miscellaneous Instruments
- 04 Well Logging Instrumentation

45 EXPLOSIONS AND EXPLOSIVES
- 01 Chemical
- 02 Nuclear
- 03 Explosion Detection

50 ENVIRONMENTAL SCIENCES, ATMOSPHERIC
- 01 Basic Studies
- 02 Chemicals Monitoring and Transport
- 03 Radioactive Materials Monitoring and Transport
- 04 Thermal Effluents Monitoring and Transport
- 05 Site Resource and Use Studies
- 06 Regulations

51 ENVIRONMENTAL SCIENCES, TERRESTRIAL
- 01 Basic Studies
- 02 Chemicals Monitoring and Transport
- 03 Radioactive Materials Monitoring and Transport
- 04 Thermal Effluents Monitoring and Transport
- 05 Site Resource and Use Studies
- 06 Regulations

52 ENVIRONMENTAL SCIENCES, AQUATIC
- 01 Basic Studies
- 02 Chemicals Monitoring and Transport
- 03 Radioactive Materials Monitoring and Transport
- 04 Thermal Effluents Monitoring and Transport
- 05 Site Resource and Use Studies
- 06 Regulations

53 ENVIRONMENTAL–SOCIAL ASPECTS OF ENERGY TECHNOLOGIES
- 01 Social and Economic Studies
- 02 Assessment of Energy Technologies
- 03 Environmental Impact Statements

55 BIOMEDICAL SCIENCES, BASIC STUDIES
01 Behavioral Biology
02 Biochemistry
03 Cytology
04 Genetics
05 Metabolism
06 Medicine
07 Microbiology
08 Morphology
09 Pathology
10 Physiological Systems
20 Public Health
30 Agriculture and Food Technology

56 BIOMEDICAL SCIENCES, APPLIED STUDIES
01 Radiation Effects
02 Thermal Effects
03 Chemicals Metabolism and Toxicity
04 Other Environmental Pollutant Effects

57 HEALTH AND SAFETY

58 GEOSCIENCES
01 Geology and Hydrology
02 Geophysics
03 Mineralogy, Petrology, and Rock Mechanics
04 Geochemistry
05 Oceanography

64 PHYSICS RESEARCH
01 Astrophysics and Cosmology
02 Atmospheric Physics
03 Atomic, Molecular, and Chemical Physics
04 Fluid Physics
50 High Energy Physics

65 PHYSICS RESEARCH (CONT.)
10 Nuclear Physics
40 Radiation and Shielding Physics
50 Medical Physics
60 Solid State Physics
70 Theoretical Physics
80 Mathematical Physics
90 Communication, Education, History, and Philosophy

70 FUSION ENERGY
01 Plasma Research
02 Fusion Power Plant Technology

99 GENERAL AND MISCELLANEOUS
01 Management
02 Mathematics and Computers
03 Information Handling
04 Law
05 Civilian Defense

CORPORATE AUTHOR INDEX

PERSONAL AUTHOR INDEX

SUBJECT INDEX

CONTRACT NUMBER INDEX

REPORT NUMBER INDEX

ORDER NUMBER CORRELATION

SUBJECT CONTENTS (ALPHABETICAL LISTING)

Six-digit subject category numbers are used in the storage, retrieval, and manipulation of bibliographic information entered into DOE's computerized bibliographic information system. The six-digit category numbers are utilized as if they were three pairs of two-digit numbers, the first two pairs being used to arrange the abstract content of *Energy Research Abstracts*. The following listing includes the totality of the 40 first-level and 294 second-level subject categories used. Because each issue of *ERA* announces only those documents becoming available during a semimonthly period, some subject categories may not be represented in every issue. The complete subject category scheme with scope notes is available as DOE/TIC-4584-R4 from NTIS for $7.00.

33 ADVANCED AUTOMOTIVE PROPULSION SYSTEMS
- 08 Alternative Fuels
- 03 Electric-Powered Systems
- 07 Emission Control
- 02 External Combustion Engines
- 05 Flywheel Propulsion
- 04 Hybrid Systems
- 01 Internal Combustion Engines
- 06 Vehicle Design Factors

56 BIOMEDICAL SCIENCES, APPLIED STUDIES
- 03 Chemicals Metabolism and Toxicity
- 04 Other Environmental Pollutant Effects
- 01 Radiation Effects
- 02 Thermal Effects

55 BIOMEDICAL SCIENCES, BASIC STUDIES
- 30 Agriculture and Food Technology
- 01 Behavioral Biology
- 02 Biochemistry
- 03 Cytology
- 04 Genetics
- 06 Medicine
- 05 Metabolism
- 07 Microbiology
- 08 Morphology
- 09 Pathology
- 10 Physiological Systems
- 20 Public Health

40 CHEMISTRY
- 01 Analytical and Separations Chemistry
- 08 Combustion Chemistry
- 04 Electrochemistry
- 02 Inorganic and Physical Chemistry
- 03 Organic Chemistry
- 05 Photochemistry
- 06 Radiation Chemistry
- 07 Radiochemistry and Nuclear Chemistry

01 COAL AND COAL PRODUCTS
- 05 By-Products
- 40 Combustion
- 09 Environmental Aspects
- 60 Health and Safety
- 50 Marketing and Economics
- 20 Mining
- 04 Processing
- 06 Properties
- 70 Regulations
- 10 Reserves and Exploration
- 30 Transport and Handling
- 08 Waste Management

20 ELECTRIC POWER ENGINEERING
- 02 Environmental Aspects
- 01 Power Plants and Power Generation
- 03 Power Transmission and Distribution

32 ENERGY CONSERVATION, CONSUMPTION, AND UTILIZATION
- 01 Buildings
- 09 Education and Public Relations
- 03 Industry and Agriculture
- 06 Municipalities and Community Systems
- 02 Transportation

30 ENERGY CONVERSION
- 02 EHD Generators
- 08 Electromechanical Converters
- 05 Fuel Cells
- 01 MHD Generators
- 04 Thermionic Converters
- 03 Thermoelectric Generators

29 ENERGY PLANNING AND POLICY
- 10 Conservation
- 80 Consumption and Utilization
- 02 Economics and Sociology
- 60 Electric Power
- 01 Energy Analysis and Modeling
- 03 Environment, Health, and Safety
- 40 Fossil Fuels
- 50 Hydrogen and Synthetic Fuels
- 04 Natural Resources
- 06 Nuclear Energy
- 30 Policy, Legislation, and Regulation
- 05 Research, Development, Demonstration, and Commercialization
- 20 Supply, Demand, and Forecasting
- 07 Transport and Storage
- 90 Unconventional Sources and Power Generation
- 08 Waste Heat Utilization

25 ENERGY STORAGE
- 09 Batteries
- 04 Capacitor Banks
- 08 Chemical
- 02 Compressed Gas
- 05 Flywheels
- 07 Liquefied Gas
- 01 Magnetic
- 03 Pumped Hydro
- 06 Thermal

42 ENGINEERING
- 10 Combustion Systems
- 08 Electronic Circuits and Devices
- 02 Facilities and Equipment
- 01 General Engineering
- 04 Heat Transfer and Fluid Flow
- 03 Lasers
- 30 Marine Engineering
- 05 Materials Testing
- 40 Pollution Control Equipment
- 50 Power Cycles
- 06 Safety Engineering
- 20 Underground Engineering
- 07 Vacuum Engineering
- 09 Waste Processing Plants and Equipment

52 ENVIRONMENTAL SCIENCES, AQUATIC
- 01 Basic Studies
- 02 Chemicals Monitoring and Transport
- 03 Radioactive Materials Monitoring and Transport
- 06 Regulations
- 05 Site Resource and Use Studies
- 04 Thermal Effluents Monitoring and Transport

50 ENVIRONMENTAL SCIENCES, ATMOSPHERIC
- 01 Basic Studies
- 02 Chemicals Monitoring and Transport
- 03 Radioactive Materials Monitoring and Transport
- 06 Regulations
- 05 Site Resource and Use Studies
- 04 Thermal Effluents Monitoring and Transport

51 ENVIRONMENTAL SCIENCES, TERRESTRIAL
- 01 Basic Studies
- 02 Chemicals Monitoring and Transport
- 03 Radioactive Materials Monitoring and Transport
- 06 Regulations
- 05 Site Resource and Use Studies
- 04 Thermal Effluents Monitoring and Transport

53 ENVIRONMENTAL–SOCIAL ASPECTS OF ENERGY TECHNOLOGIES
- 02 Assessment of Energy Technologies
- 03 Environmental Impact Statements
- 01 Social and Economic Studies

45 EXPLOSIONS AND EXPLOSIVES
- 01 Chemical
- 03 Explosion Detection
- 02 Nuclear

70 FUSION ENERGY
- 02 Fusion Power Plant Technology
- 01 Plasma Research

06 FUSION FUELS
- 03 By-Products
- 09 Environmental Aspects
- 05 Health and Safety
- 02 Processing
- 08 Properties
- 06 Regulations and Policy
- 01 Sources
- 04 Transport and Storage
- 07 Waste Management

99 GENERAL AND MISCELLANEOUS
- 05 Civilian Defense
- 03 Information Handling
- 04 Law
- 01 Management
- 02 Mathematics and Computers

58 GEOSCIENCES
- 04 Geochemistry
- 01 Geology and Hydrology
- 02 Geophysics
- 03 Mineralogy, Petrology, and Rock Mechanics
- 05 Oceanography

15 GEOTHERMAL ENERGY
- 07 By-Products
- 10 Direct Energy Utilization
- 05 Economic and Financial Aspects
- 06 Environmental Aspects and Waste Disposal
- 02 Geology, Hydrology, and Geothermal Systems
- 20 Geothermal Data and Theory
- 09 Geothermal Engineering
- 03 Geothermal Exploration and Exploration Technology
- 08 Geothermal Power Plants
- 04 Legal and Institutional Aspects
- 01 Resource Status and Assessment

57 HEALTH AND SAFETY

13 HYDRO ENERGY
- 05 Economics and Management
- 06 Environmental Aspects
- 03 Plant Design and Operation
- 07 Power Conversion Systems
- 04 Regulations and Licensing
- 01 Resources and Availability
- 02 Site Geology and Meteorology

08 HYDROGEN
- 07 By-Products
- 09 Environmental Aspects
- 06 Industrial and Commercial Use
- 04 Marketing and Economics
- 01 Production
- 08 Properties
- 05 Safety
- 02 Storage
- 03 Transport

44 INSTRUMENTATION
- 03 Miscellaneous Instruments
- 02 Radiation Effects on Instrument Components, Instruments, or Electronic Systems
- 01 Radiation Instrumentation
- 04 Well Logging Instrumentation

07 ISOTOPE AND RADIATION SOURCE TECHNOLOGY
- 03 Isotopic Power Supplies
- 01 Physical Isotope Separation
- 02 Radiation Sources

36 MATERIALS
- 02 Ceramics, Cermets, and Refractories
- 03 Composite Materials
- 01 Metals and Alloys
- 06 Other Materials
- 04 Polymers and Plastics

03 NATURAL GAS
- 09 Artificial Stimulation, Plowshare, etc.
- 40 Combustion
- 03 Drilling, Production, and Processing
- 08 Environmental Effects
- 02 Geology and Exploration
- 05 Health and Safety
- 06 Marketing and Economics
- 10 Policy, Legislation, and Regulation
- 04 Products and By-Products
- 30 Properties
- 01 Reserves
- 50 Storage
- 20 Transport, Pipelines, and Handling
- 07 Waste Management

05 NUCLEAR FUELS
- 06 By-Products
- 05 Enrichment
- 30 Environmental Aspects
- 02 Exploration
- 04 Feed Processing
- 07 Fuels Production and Properties
- 40 Health and Safety
- 10 Marketing and Economics
- 03 Mining
- 50 Regulations
- 01 Reserves
- 08 Spent Fuels Reprocessing
- 09 Transport and Storage
- 20 Waste Management

21 NUCLEAR POWER PLANTS
- 08 Economics
- 06 Power Reactors, Auxiliary, Mobile, Package, and Transportable
- 05 Power Reactors, Breeding
- 03 Power Reactors, Non-Breeding, Graphite Moderated
- 01 Power Reactors, Non-Breeding, Light-Water Moderated, Boiling Water Cooled
- 02 Power Reactors, Non-Breeding, Light-Water Moderated, Non-Boiling Water Cooled
- 04 Power Reactors, Non-Breeding, Otherwise Moderated or Unmoderated
- 09 Process Heat Reactors
- 07 Regulation and Licensing

22 NUCLEAR REACTOR TECHNOLOGY
- 02 Components and Accessories
- 04 Control Systems
- 05 Environmental Aspects
- 03 Fuel Elements
- 07 Plutonium and Isotope Production Reactors
- 08 Propulsion Reactors
- 09 Reactor Safety
- 06 Research, Test, and Experimental Reactors
- 01 Theory and Calculation

04 OIL SHALES AND TAR SANDS
- 06 Direct Uses and By-Products
- 03 Drilling, Fracturing, and Mining
- 10 Environmental Aspects
- 07 Health and Safety
- 08 Marketing and Economics
- 04 Oil Production, Recovery, and Refining
- 05 Properties and Composition
- 20 Regulations
- 01 Reserves and Exploration
- 02 Site Geology and Hydrology
- 09 Waste Research and Management

09 OTHER SYNTHETIC AND NATURAL FUELS
- 02 Alcohol Fuels
- 06 Gaseous Waste Fuels
- 01 Hydrocarbon Fuels
- 03 Inorganic Hydrogen Compound Fuels
- 05 Liquid Waste Fuels
- 04 Solid Waste Fuels

43 PARTICLE ACCELERATORS
- 03 Auxiliaries and Components
- 02 Beam Dynamics, Field Calculations, and Ion Optics
- 01 Design, Development, and Operation
- 04 Storage Rings

02 PETROLEUM
- 50 Combustion
- 03 Drilling and Production
- 09 Environmental Aspects
- 02 Geology and Exploration
- 06 Health and Safety
- 07 Marketing and Economics
- 10 Policy, Legislation, and Regulation
- 04 Processing
- 05 Products and By-Products
- 30 Properties
- 01 Reserves
- 40 Storage
- 20 Transport, Pipelines, and Handling
- 08 Waste Management

64 PHYSICS RESEARCH
- 01 Astrophysics and Cosmology
- 02 Atmospheric Physics
- 03 Atomic, Molecular, and Chemical Physics
- 04 Fluid Physics
- 50 High Energy Physics

65 PHYSICS RESEARCH (CONT.)
- 90 Communication, Education, History, and Philosophy
- 80 Mathematical Physics
- 50 Medical Physics
- 10 Nuclear Physics
- 40 Radiation and Shielding Physics
- 60 Solid State Physics
- 70 Theoretical Physics

14 SOLAR ENERGY
- 03 Economics
- 04 Environmental, Legal, and Institutional Aspects
- 20 Heat Storage
- 08 Ocean Thermal Gradient Power Plants
- 06 Photovoltaic Power Plants
- 01 Resources and Availability
- 10 Solar Collectors and Concentrators
- 05 Solar Energy Conversion
- 09 Solar Radiation Utilization
- 07 Solar Thermal Power Plants

16 TIDAL POWER
- 04 Economics
- 05 Environmental Aspects
- 03 Regulations
- 07 Tidal Power Plants
- 08 Wave Energy Converters

17 WIND ENERGY
- 01 Availability (Climatology)
- 04 Economics
- 05 Environmental Aspects
- 03 Regulations
- 06 Wind Energy Engineering

CORPORATE AUTHOR INDEX

PERSONAL AUTHOR INDEX

SUBJECT INDEX

CONTRACT NUMBER INDEX

REPORT NUMBER INDEX

ORDER NUMBER CORRELATION

ENERGY RESEARCH ABSTRACTS

01 COAL AND COAL PRODUCTS

0104 Processing

REFER ALSO TO CITATION(S) 53368, 53371, 53372, 53373, 53381, 53382, 53384, 53414, 53415, 53416, 53417, 53420, 53422, 53422, 53742, 53783, 54115

53334 (CONF-7909271—1) Direct hydrogenation and solvent extraction of coal. Lacey, J.J. (Department of Energy, Pittsburgh, PA (USA). Pittsburgh Energy Technology Center). Sep 1979. 18p. NTIS, PC A02/MF A01. Order Number DE83008416.

From Coal liquefaction meeting; Tulsa, OK, USA (1 Sep 1979).

Recent fuel cost increases coupled with energy shortages have resulted in an awareness of the need to conserve energy and to expand the United States domestic energy base. Increase in coal conversion and utilization are major objectives of the research and development activities in the US Department of Energy. Several alternate processing schemes are being developed to convert coal to environmentally acceptable liquid fuels. A few of these technologies are approaching the commercialization stage and scale-up is being carried forward on the most promising processes. The various coal liquefaction processes are discussed by dividing them into four general classifications. Processes for converting various types of coal to synthetic liquid fuels are being improved so that clean fuels can be produced commercially. Emphasis is on the production of fuels suitable for firing industrial and electric utility boilers and on synthetic crude oils for upgrading to liquids for use in transportation and home heating. Three (3) processes are now in the pilot plant phase, Solvent Refined Coal, H-Coal and Donor Solvent Processes.

53335 (DOE/ET/10324—T55) Engineering-support services for the DOE/GRI coal-gasification research program. Monthly technical progress report, 27 February-26 March 1982. Bostwick, L.E.; Ethridge, T.R.; Starr, D.W.; Hubbard, D.A.; Koneru, P.B.; Smith, M.R.; Ward, W.E.; Wong, E.W.; Zeis, L.A. (Kellogg (M.W.) Co., Houston, TX (USA)). Apr 1982. Contract AC01-78ET10324. 18p. (FE—2778-72). NTIS, PC A02/MF A01. Order Number DE83011007.

During March, Kellogg continued to monitor operations at BI-GAS, Westinghouse and IGT Peatgas. Test runs monitored and reported were: BI-Gas tests G-18A and G-18B; Westinghouse PDU test: TP-032-1, and CFSF test TP-M003; Peatgas pilot plant test No. 5 at IGT. Kellog personnel briefed the Gas Research Institute (GRI) Project Advisors in regard to recent tasks and attended the Westinghouse briefing for GRI. Meetings of the DOE/GRI Joint Operating Committee were attended to discuss the Data Base Evaluation of Single-Stage Peat Gasification and the Joint Program Brochure. Kellogg proceeded to finalize the data base evaluation report and to institute necessary changes in the brochure.

53336 (DOE/FE/55014—T5) Great Plains Gasification Associates. Quarterly technical and environmental report, Great Plains coal gasification project, Mercer County, North Dakota, second quarter, 1983. (Great Plains Gasification Associates, Detroit, MI (USA)). 1983. Contract FM01-82FE55014. 160p. NTIS, PC A08/MF A01. Order Number DE83016156.

Portions are illegible in microfiche products.

Activities remain on schedule to meet Great Plains Gasification Associate's start-up and coal delivery dates as well as the completion of the pipeline. Home Office engineering is essentially complete for the Plant. The remaining engineering tasks will involve field support activities and special projects. A substantial amount of construction progress was achieved during the second quarter. Although construction is still slightly behind schedule for the Plant, it is currently forecasted that construction will be back on schedule by the end of October, 1983. Start-up activities are continuing at a rapid pace. The current emphasis is on precommissioning planning and the development and implementation of the computer systems required to run the plant. Mine development activities remain on schedule. Almost all of the environmental permitting for the construction phase is complete. Engineering for the pipeline is complete. Construction started this quarter and should be completed by August 15, 1983.

53337 (DOE/MC/14731—1439) Experimental studies on the control of hydrocarbons emission from a gasifier. Final report, September 1981-February 1983. Tamhankar, S.S.; Tsuchiya, K. (West Virginia Univ., Morgantown (USA). Dept. of Chemical Engineering). 1983. Contract AT21-80MC14731. 111p. NTIS, PC A06/MF A01. Order Number DE83015428.

The objective of this work was to study kinetics of catalytic cracking of benzene, using a catalyst selected based on the literature search, and to investigate effects of conditions prevailing in a typical gasifier. The aim is to identify and evaluate a catalyst which would be effective in controlling hydrocarbons emission from a gasifier, itself. The scope of the work mainly includes kinetic studies on benzene cracking using a selected catalyst, investigation of catalyst deactivation and poisoning effects, if any, and the reaction rate modeling. The four tasks within this scope of work are as follows: reactor development; kinetic studies; deactivation and poisoning; and reaction rate modeling. 63 references, 32 figures, 5 tables.

53338 (DOE/PC/30209—T1) Solvent tailoring in coal liquefaction. Quarterly report, May 1982-August 1982. Tarrer, A.R.; Guin, J.A.; Curtis, C.W.; Williams, D.C. (Auburn Univ., AL (USA)). 1982. Contract FG22-80PC30209. 76p. NTIS, PC A05/MF A01. Order Number DE83017443.

Portions are illegible in microfiche products.

The initial objective of this work was to study the phase distribution of donor solvents and solvent mixtures during the liquefaction of coal, to investigate the effects of phase distribution on coal conversion, and to determine the advantages, if any, of operating at subcritical and/or supercritical conditions. Computer simulations were used to predict the phase distribution, for various binary systems, as a function of temperature. The FLASH program was used to theoretically predict phase distribution for various model systems. Due to limitations in the computer program, success was achieved only in a few cases. Even in these cases, the existence of two-phase regions was observed only at temperatures and pressures far below normal liquefaction conditions. An extensive review of the literature was carried out in order to survey methods of experimentally studying vapor-liquid equilibria. Finally, some preliminary laboratory studies were carried out with the use of benzothiophene-dodecane as the model reaction system. It was felt that the study of the effect of reactor configuration on conversion would provide insight into whether phase distribution or mass transfer was the limiting consideration for coal conversion. However, no conclusive results were obtained from these studies.

53339 (DOE/PC/30209—T2) Solvent tailoring in coal liquefaction. Quarterly report, August 1982-November 1982. Tarrer, A.R.; Guin, J.A.; Curtis, C.W.; Williams, D.C. (Auburn Univ., AL (USA)). 1982. Contract FG22-80PC30209. 96p. NTIS, PC A05/MF A01. Order Number DE83017420.

Portions are illegible in microfiche products.

A gradientless, high-pressure, continuous reaction system equipped with a carberry-type catalyst basket, was designed and built for hydrotreating liquid feedstocks. A model reaction system (naphthalene dissolved in a carrier vehicle) was used to verify the key results of the simulation study. Investigation of the sensitivity of hydrotreater performance to variations in the volatility of the feedstream were continued. Hydrogenation activity was found to be highly sensitive to differences in the volatility of feedstreams. As part of the sensitivity analyses with respect to feedstream volatility, the reactor was simulated to study the highly interactive effects of hydrogen flowrate, feed concentration, temperature, and pressure. With the use of heavy carrier solvents (e.g. hexadecane or white oil) naphthalene conversion was insensitive to increases in hydrogen flowrate (above the theoretical minimum) or increases in hydrogen flowrate (above the theoretical minimum) or increases in feed concentration. However, with the use of a light carrier solvent (e.g. toluene or cyclohexane) naphthalene conversion was sensitive to both increases in hydrogen flowrate and increases in feedstream concentration. The sensitivity of conversion to reactor pressure was found to be greater for the heavier feed system. It is thus worth noting that the failure to account for liquid vaporization effects could lead to false activation energies and frequency factors. A possible disadvantage to concentrating the reactants and increasing their residence time, with the use of a highly volatile vehicle medium, could be accelerated catalyst deactivation.

53340 **(DOE/PC/30209—T3) Solvent tailoring in coal liquefaction. Quarterly report, February 1982-May 1982.** Tarrer, A.R.; Guin, J.A.; Curtis, C.W.; Williams, D.C. (Auburn Univ., AL (USA)). 1982. Contract FG22-80PC30209. 34p. NTIS, PC A03/MF A01. Order Number DE83017442.

Portions are illegible in microfiche products.

Twenty-three model donor solvents were used to rank their efficacy for the dissolution of Western Kentucky No. 9/14 coal. The transfer of hydrogen from the solvent to the coal fragments, as measured by coal conversion, was examined at three levels of available hydrogen. The hydrogen donors are ranked according to their ability to convert coal to THF solubles. Aromatic analogs of the model donors showed little ability to convert coal to THF solubles. Factors which influence hydrogen donation include the presence of heteroatoms or substituents both internal and external to the aromatic or hydroaromatic rings, the degree of hydrogenation, the aromaticity or nonaromaticity of the hydroaromatics, and the presence of five-membered rings. A relationship between heats of formation and hydrogen donor ability was shown for hydroaromatics within two ring or three ring homologous series. A model hydrogen acceptor, benzophenone, was also used to rank model donors and a comparison was made with the model donor ranking by coal conversion. The ranking of hydrogen donors at the same donatable hydrogen level for their ability to convert coal to THF solubles demonstrates that different donors have different abilities to liquefy coal. The presence of donatable hydrogen constitutes a necessary and important factor in coal conversion as evidenced by comparison with the conversion aromatic analogs. However, properties of the model donors other than the concentration of available hydrogen can affect THF solubles. The ease with which hydrogen is abstracted from a particular donor, as well as the functional groups and heteroatoms present, are significant factors affecting reactivity of the hydrogen donors during liquefaction. Ranking of hydrogen donor reactivity by coal conversion and by model acceptor experiments shows no direct correlation between the two.

53341 **(DOE/PC/30209—T4) Solvent tailoring in coal liquefaction. Quarterly report, November 1982-February 1983.** Tarrer, A.R.; Curtis, C.W.; Guin, J.A.; Williams, D.C. (Auburn Univ., AL (USA). Coal Conversion Lab.). 1983. Contract FG22-80PC30209. 46p. NTIS, PC A03/MF A01. Order Number DE83017435.

Portions are illegible in microfiche products.

A simple kinetic model, including a first-order catalyst deactivation rate, was applied to the upgrading of coal-derived feedstocks prepared from two solvent-refined coal fractions. A catalyst deactivation mechanism was proposed which involves the adsorption and surface reaction of coke precursors on active catalytic sites. The effect of feedstock composition, temperature, and pressure on kinetic parameters and, in particular, the catalyst deactivation rate, was determined. 21 references, 6 figures, 7 tables.

53342 **(DOE/PC/40784—T2) Dependence of liquefaction behavior on coal characteristics. Part IV. Contributions to the understanding of the phenomenology of coal liquefaction. Final technical report, March 1981-February 1984.** Youtcheff, J.S.; Given, P.H. (Pennsylvania State Univ., University Park (USA). Coal Research Section). Sep 1983. Contract AC22-81PC40784. 262p. NTIS, PC A12/MF A01. Order Number DE83017544.

Thesis. Submitted by J.S. Youtcheff.

The success of scaling up liquefaction pilot plants to commercial units will depend largely on the predictability of liquefaction phenomena, as well as adaptability to variable behavior of coals. It was the objective of this study to define in more detail the phenomenology of coal liquefaction, and to provide a scientific basis for empirical correlations previously established between liquefaction conversion and basic compositional characteristics of coals. To this end, two approaches were taken, each involving a separate set of coals. The rates of production of products of varying solubility were determined for three coals, two of Carboniferous and one of Cretaceous age. Products are formed more slowly from the younger coal. It is estimated that the maximum content of 0 as cleavable ether is 7.7 atoms/100 C atoms for the Wyoming coal, and 4.1 and 5.1 for the other two (from Oklahoma and Ohio, respectively). A comparison of the energetics for conversion to THF-solubles and for unaccounted oxygen removal was undertaken. The similarity between the two at comparable levels further confirms the importance of ether cleavage reactions at low levels of conversion. FTIR studies were conducted on the coal products to further illuminate the nature of the macromolecular structure. The yield of alkanes following liquefaction of three different coals was found to vary from 5.7 to 8.8 times the amount obtainable through Soxhlet extraction. The triterpanes in the various hexane-soluble fractions were identified by GC-MS. Since the distribution and relative abundance of these biological markers did not vary appreciably, it was felt that the additional alkanes found on liquefaction had been physically trapped in the coal matrix, rather than being chemically combined with it. Thus, the concept of a trapped mobile phase in coals is confirmed.

53343 **(DOE/PC/50784—T1) Improving the quality of deteriorated recycle solvents. Quarterly report, August 1982-November 1982.** Tarrer, A.R.; Guin, J.A.; Curtis, C.W. (Auburn Univ., AL (USA). Coal Conversion Lab.). 1982. Contract FG22-82PC50784. 28p. NTIS, PC A03/MF A01. Order Number DE83017505.

Portions are illegible in microfiche products.

The overall objective of this work is to identify reasons for solvent degeneration and to determine a feasible mechanism whereby coal-liquefaction processes can be modified to inhibit solvent degradation during the liquefaction process. In this work, the response in product distribution (or oil yield) to different pre-treatment methods was investigated. In related past works, solvent quality was based solely on the amount of standard coal conversion. In this work, solvent quality was also determined with the use of a standard product separation procedure. A brief discussion of related past works is followed up by a discussion of current work in the area of upgrading deteriorated recycle solvents. The effect of solvent pre-treatment on quality during thermal (non-catalytic) and catalytic liquefaction of coal was examined, and a comparison was made. In addition, the effect of the presence of typical compounds found in coal liquids (e.g. pyrene), during solvent pre-treatment, on solvent quality was also investigated. 2 references, 3 figures, 5 tables.

53344 **(DOE/PC/50786—T1) Facile reaction/extraction of coal with supercritical fluids. Quarterly technical progress report, April 1, 1983-June 30, 1983.** Venier, C.G.; Squires, T.G. (Iowa State Univ. of Science and Technology, Ames (USA). Energy and Mineral Resources Research Inst.). 1 Sep 1983. Contract FG22-82PC50786. 7p. NTIS, PC A02/MF A01. Order Number DE83017481.

In summary, model studies have provided the following information. An aprotic solvent will be required for both transalkyla-

tion and ionic hydrogenation; a non-nucleophilic solvent will be required for ionic hydrogenation; intromolecular reaction will occur in the reactions of phenyl ethers; and in an aromatic solvent, arylation (transalkylation) occurs in preference to ionic hydrogenation. Model studies of the ionic hydrogenation were continued using a copolymer of 1,4-bis(bromomethyl)naphthalene and hydroquinone to mimic the solid, insoluble nature of coal. The results are shown. Infrared spectra of products in experiments 1 and 4 are virtually indistinguishable and indicate that none of the original polymer remains. This establishes that the reaction takes essentially the same course in the presence and absence of triethylsilane. However, the solubilities of the products in the presence and absence of triethylsilane is dramatically different. Since solubility is a sensitive function of molecular weight for oligomeric systems, the solubility of the attempted ionic hydrogenation product signals its lower molecular weight. This indicates that hydride has indeed captured enough of the benzylic cations to change the physical properties of the product. Changes in acid strength indicate that stronger acids lead to more solubility (lower molecular weight) in the presence of the same molar ratio of hydride source. Experiments show that increasing hydride concentration beyond six equivalents only slightly increases the solubility of the product. Using these results as a basis, we will next perform both the transalkylation and ionic hydrogenation of coal.

53345 (DOE/PC/50793—T3) Cooperative investigation by Auburn University and Cities Service Research and Development Company of combined coal and heavy-resid processing. Quarterly report, January 15, 1983-April 15, 1983. Curtis, C.W.; Guin, J.A.; Tarrer, A.R. (Auburn Univ., AL (USA). Coal Conversion Lab.). 1983. Contract FG22-82PC50793. 38p. NTIS, PC A03/MF A01. Order Number DE83016738.

The overall objective of the program is to determine if relatively hydrogen-rich petroleum fractions can be used to liquefy coal such that the net yield of liquids from the combined coal-residuum process is enhanced. In essence, simultaneous upgrading would transform both coal and petroleum resid into lighter synthetic fuel products of higher value. During the quarter, work proceeded in two areas, (1) an experimental evaluation of the potential for coal dissolution with petroleum crudes and resids, (2) an investigation of the change in pore diffusivity in catalyst pellets due to the processing of coal derived materials. Detailed progress in the second area is reported in the body of this report. From the work performed thus far, it appears that the petroleum derived materials do not perform as well as tetralin in the liquefaction of coal. These results indicate that a catalyst may be required to obtain sufficient liquefaction yields utilizing the petroleum-based solvents. Based on knowledge from previous work, it is anticipated that catalyst lifetime and pore diffusivity considerations will be major factors when using supported catalysts, e.g. Ni-Mo/Al_2O_3, to process these materials. Thus, some work in this area has been performed, and is reported on in detail in this quarterly report. 37 references, 5 figures, 10 tables.

53346 (NYSERDA—83-8-Vol.1) Gasification of Simplex briquets: briquet production. Vol.1. Final report. (Dynecology, Inc., Harrison, NY (USA)). Apr 1983. 44p. New York State Energy Research and Development Authority, Two Rockefeller Plaza, Albany, NY 12223.

A 7-ton/hr briquetting plant was installed at International Briquetting in Baltimore, Maryland, and used to produce 360 tons of Simplex briquets from Pittsburgh No. 8 seam, Champion No. 1 mine caking coal and shredded, air-classified Baltimore County refuse. The production of these briquets was funded by the Department of Energy, through the US Bureau of Mines, and a consortium comprised of the New York State Energy Research and Development Authority and the Empire State Electric Energy Research Company. This report describes the briquetting plant and discusses the problems that were encountered in producing the briquets. The following modifications are recommended for future Simplex briquetting plants: drying equipment should be installed on the RDF feed system to ensure that the RDF moisture is below 18%; the crushed coal must be dried to less than 4% moisture to ensure its free flow in the bins; magnets should be installed above the coal and RDF feed conveyors to remove any tramp metal; a 3/4-inch screen should be installed over the coal feed bin to remove any oversize rocks or lump coal; the RDF handling system and turbulizer discharge to the press should all be enclosed for dust control (the enclosures should be vented to a baghouse); only heavy duty apron conveyors should be used where belt conveyors are needed; briquetts should be cured if they are going to be stored in containers where they might swent; and a screen with 1 1/4-inch openings should be used to remove the fines from 2 1/4-inch briquets (this screen should be sufficiently large to prevent briquets from crowding together on the screen).

53347 (NYSERDA—83-8-Vol.2) Gasification of Simplex briquets: demonstration in the General Electric high-pressure gasifier. Vol.2. Final report. (Dynecology, Inc., Harrison, NY (USA)). Apr 1983. 88p. New York State Energy Research and Development Authority, Two Rockefeller Plaza, Albany, NY 12223.

This report presents the findings and conclusions for a number of gasification runs conducted by the General Electric Company (GE) in their 24 ton-per-day, high-pressure, moving-burden gasifier at Schenectady, NY. The objective of this test program was to evaluate the caking propensity and gasification characteristics of Simplex briquettes for this test program from Pittsburgh No. 8 coal fines and Baltimore County RDF (the combustible fraction of municipal solid waste). GE also conducted a base-line run employing tar-bonded Pittsburgh No. 8 coal briquettes. Details of the gasifier system, operating procedure, primary test data and a tentative interpretation of results are presented by GE in a Final Report which is included as Appendix A. The body of this report is presented in Sections II and III. Section II gives an analysis by Dynecology Inc. of the GE findings and test data. Section III lists the Conclusions drawn by DI, which are supported by the above analysis. The principal conclusion is that Simplex briquettes (in both the 3 : 2 and 2 : 1 coal/Rdf ratios) can be gasified in the GE facility at pressures of 100 and 300 psig without caking or stirring. By contrast, the Pittsburgh No. 8 coal/coal tar briquettes cannot be processed in this 3'-diameter gasifier without deep-bed stirring. Also, the tar-bonded briquettes produced an excessive quantity of tars.

53348 (ORNL/TM—8227) Physical properties of SRC-I slurries under preheater conditions. Final report. Lee, D.D.; Gibson, M.R. (Oak Ridge National Lab., TN (USA)). Sep 1983. Contract W-7405-ENG-26. 119p. NTIS, PC A06/MF A01. Order Number DE83018301.

In support of the SRC-I Demonstration Plant Project, rheological and density measurements have been made on recycle solvent made from Kentucky No. 9 coal and on slurries of recycle solvent and Kentucky No. 9 coal at a 1.6 solvent/coal ratio. The measurements were taken at temperatures of 300 to 728°K (80 to 850°F) and pressures of atmospheric, 1.14 MPa (150 psig), 7.00 MPa (1000 psig), and 17.34 MPa (2500 psig). These calculations are required for preheater and feed pump design of coal demonstration plants and, in particular, by the International Coal Refining Company (ICRC) for the SRC-I demonstration plant design effort. The determinations were made in the Oak Ridge National Laboratory Coal Liquids Flow System (CLFS).

53349 (PB—83-239533) Fugitive emission testing at the Kosovo coal gasification plant. Final task report Apr 79-Sep 81. Honerkamp, R.L.; Dalrymple, D.A. (Radian Corp., Austin, TX (USA)). Jun 1983. 210p. NTIS, PC A10/MF A01.

The report summarizes results of a test program to characterize fugitive emissions from the Kosovo coal gasification plant in Yugoslavia, a test program implemented by the EPA in response to a need for representative data on the potential environmental impacts of Lurgi coal gasification technology. Major objectives of the fugitive emissions assessment were to: (1) determine the frequency of leak occurrence, (2) measure leak rates from leak sources, (3) estimate total fugitive emissions from leakage, and (4) compare the results to other fugitive emission test data. Study results show similarities to results of fugitive emission testing in U.S. oil refineries and organic chemical plants.

53350 **(SAND—83-7110) Studies on aged H-Coal catalysts. Final report.** Massoth, F.E.; Cable, T.L. (Utah Univ., Salt Lake City (USA). Dept. of Fuels Engineering). Aug 1983. Contract AC04-76DP00789. 20p. NTIS, PC A02/MF A01. Order Number DE83017811.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This report covers work performed at the University of Utah for Sandia National Laboratories. This work includes the development of a method for the determination of the hydrodeoxygenation (HDO) activity of catalysts, and the use of oxygen chemisorption and Electron Spectroscopy for Chemical Analysis (ESCA) methods for the determination of sintering effects in used catalysts. These analytical methods were applied to American Cyanamid 1442A catalyst samples from H-Coal Process Demonstration Unit run No. 9 in order to determine the causes for catalyst deactivation. The results of this research show that residual hydrodeoxygenation activity decreases to less than 10% (compared to fresh catalyst) after one day of processing coal. Even on regenerated catalyst pellets, the hydrodeoxygenation activity drops sharply with exposure time. This permanent loss in activity probably results from lateral growth of the Mo sulfide phase during processing. In addition, there is a loss in Co promotion which occurs early in the process and accounts for rapid loss in hydrodesulfurization activity in regenerated catalysts. The greatest deactivation in PDU run No. 9 catalysts is due to coke buildup which causes massive pore blockage and specific active site coverage.

53351 **(UCRL—15548) Laboratory test procedure to determine the mobilization of trace elements and other pollutants during in-situ coal gasification.** Manahan, S.E.; Gale, R. (Missouri Univ., Columbia (USA). Dept. of Chemistry). 16 May 1983. Contract W-7405-ENG-48. 10p. NTIS, PC A02/MF A01. Order Number DE84000172.

A laboratory method has been developed to demonstrate the mobilization potential of trace elements during in situ coal gasification. The trace elements can be introduced in various forms, and gasification conditions may be varied. The specific objectives of the research were the following: (1) To optimize the operational parameters of a device developed for the simulation of in situ coal gasification in both the forward- and reverse-burn modes so that it may be used most effectively as a laboratory test method to determine the mobilization potential of trace elements and other pollutants that may be generated or released during in situ coal gasification. (2) To optimize methods for spiking coal with inorganic compounds and organic forms of trace elements for the study of their mobilization during in situ coal gasification. (3) To determine the release of selected trace elements during laboratory - simulated in situ coal gasification as a means of determining the pollution potential of these elements during in situ gasification. Among the elements suggested for examination were aluminum, arsenic, boron, cadmium, chromium, copper, iron, manganese, nickel, lead, antimony, selenium, strontium, and zinc. 2 references, 4 tables.

53352 **Direct mass-spectrometric studies of the pyrolysis of carbonaceous fuels. I. A flame-pyrolysis molecular-beam sampling technique.** Milne, T.A.; Soltys, M.N. (Solar Energy Research Inst., Golden, CO). *Journal of Analytical and Applied Pyrolysis;* **5**: No. 2, 93-110(Jul 1983).

A new approach is described to observe, in real time and under realistic environments, the molecular processes of both primary and secondary pyrolysis of carbonaceous solids. The method employs the burnt-gas region of one-atmosphere hydrogen-oxygen-argon flames as the pyrolysis medium and permits the observation of the evolved vapor by direct, free-jet, molecular-beam mass spectrometry. The features of the sampling system are described and the phenomena accompanying sampling are discussed. Performance of the flame-pyrolysis and sampling system is documented. Applications are also discussed. 8 figures, 1 table.

53353 **Effects of additives upon the thermal degradation of subbituminous coals.** Vanderborgh, N.E. (Los Alamos National Lab., NM); Jones, C.E.R.; Verzino, W.J.; Haverkamp, J. *Journal of Analytical and Applied Pyrolysis;* **5**: No. 1, 9-26(Apr 1983).

The effects of homogeneous additives upon the thermal degradation of subbituminous coal are described. Additives consisting of zinc chloride, sodium carbonate, lead nitrate, sodium titanate or sodium molybdate were blended into separate coal samples. Using Curie-point pyrolysis at 610°C monitored by mass spectrometry data were determined on the samples, both in an as received state and following reduction in a flowing H_2-H_2O stream. Data show that specific chemical additives are effective in altering pyrolysis distributions. Likewise additives alter the extent of methanol retention during sample preparation. These data are explained through a coal model that suggests these additives alter mass transport rates of volatile compounds exiting from these coaly materials and that such volatiles are the predominant features produced during coal pyrolysis. 2 figures, 4 tables.

53354 **Fundamentals of gas-carbon reactions; chemistry and characterization of coal macerals; general papers: coal to liquid products; general papers: chemistry and characterization of fossil fuels.** Washington, DC; American Chemical Society (1983). 215p. (CONF-830303—). American Chemical Society, Washington, DC $8.00.

From 185. American Chemical Society national meeting; Seattle, WA, USA (20 Mar 1983).

There are 30 papers included in the Symposium on Fundamentals of Gas-Carbon Reactions. Separate abstracts have been prepared for 29 of these. (BLM)

53355 **Transient kinetic studies of char reactions in a gradientless reactor system: CO_2 gasification.** Sy, O.; Calo, J.M. (Brown Univ., Providence, RI). *Preprints of Papers - American Chemical Society, Division of Fuel Chemistry;* **28**: No. 1, 6-16(1983). (CONF-830303—). Contract FG22-80PC30211;FG22-81PC40786.

From 185. American Chemical Society national meeting; Seattle, WA, USA (20 Mar 1983).

An experimental apparatus developed for the study of current transition kinetic studies of the heterogeneous coal char-gas reactions in which the elementary steps can be better identified is described. The apparatus consists of a continuous gas flow, fixed solids, gradientless reactor; an automatic switching gas addition valve network for generating concentration perturbations under conditions of constant flow rate, temperature, and pressure; and supersonic, modulated, molecular beam mass spectrometer for measuring the transient behavior of the concentrations of the product gases. A general overview of the mode of operation if the equipment is included. Data are given for CO_2 gasification which demonstrate the successful application of the experimental apparatus and transient response techniques to heterogeneous char-gas reactions. (BLM)

53356 **Study of the role of alkali metal salts as char gasification catalysts by Knudsen cell mass spectrometry.** Wood, B.J.; Brittain, R.D.; Lau, K.H. (SRI International, Menlo Park, CA). *Preprints of Papers - American Chemical Society, Division of Fuel Chemistry;* **28**: No. 1, 55-61(1983). (CONF-830303—).

From 185. American Chemical Society national meeting; Seattle, WA, USA (20 Mar 1983).

Results of Knudsen cell mass spectrometry studies of the alkali metal salts catalysis of char gasification are presented. K_2CO_3 and Cs_2CO_3 were used as catalysts, and there is indication that there is a strong interaction between the salts and carbon at elevated temperatures. The data gave no direct clue to the structure of the solid or liquid phase, but they do suggest that oxygen is a component because oxygen-containing gaseous species were observed to be in equilibrium with the substance. The chemical species formed is proposed to be a non-stoichiometric oxide that contains an excess of the metal as ions and also in a dissolved state. It is suggested that during gasification, the catalyst forms a liquid oxide film distributed over the surface of the carbon or char. (BLM)

53357 **Effects of catalysts and CO_2 gasification on the ESR of carbon black. II.** Sancier, K.M. (SRI International, Menlo Park, CA). *Preprints of Papers - American Chemical Society, Division of Fuel Chemistry;* **28**: No. 1, 62-70(1983). (CONF-830303—). Contract AC21-80MC14593.

From 185. American Chemical Society national meeting; Seattle, WA, USA (20 Mar 1983).

Results from in situ electron spin resonance (ESR) studies of the thermal interaction between carbon black and various salts and the effect of CO_2 gasification conditions are reported. The ESR technique has also been used to provide information on changes in the electrical conductivity of a sample that may relate to the mechanisms of the thermal and gasification reactions. In studies involving the thermal interaction between a series of potassium halide-carbon black mixtures (with a K_2CO_3-carbon black and CaO-carbon black mixtures for comparison), the free radical concentrations uncorrected for Curie's law were essentially independent of both the measured temperature and the type of salt. The effect on line width of the ESR spectra and the magnitude of the irreversible effects for the salts decreased according to the order: KBr ≃ KCl ≃ KI > K_2CO_3 ≃ KF > CaO. The electrical conductivity parameter generally increased with temperature and was almost independent of the type of salt in the mixture. Very small or no changes were noted in line width, free radical concentration, or electrical conductivity when carbon black alone or in combination with potassium halides or with CaO were exposed to CO_2 gasification conditions at 850°K. Mechanisms are proposed that explain the observed phenomena. (BLM)

53358 **Low temperature methane production by the catalyzed reaction of graphite and water vapor.** Delanny, F.; Tysoe, W.T.; Yee, G.; Cassanova, R.; Heineman, H.; Somarjai, G. (Lawrence Berkeley Lab, CA). *Preprints of Papers - American Chemical Society, Division of Fuel Chemistry;* **28**: No. 1, 77-84(1983). (CONF-830303—). Contract AC03-76SF00098.

From 185. American Chemical Society national meeting; Seattle, WA, USA (20 Mar 1983).

Studies were carried out in two different reactors to accommodate either graphite single crystals or graphite powder on the production of methane by gasification of coal with water vapor at temperatures up to 1075°K rather than the usual 1200°K. The reactor vapor pressure was varied from 20 to 600 torr; and in addition to alkali metal hydroxides, effects of calcium oxide and transition metals as catalysts were investigated. All products were analyzed by gas chromotography. The production of methane exhibited the same apparent activation energy within the temperature range of 525 to 1075°K, indicating that the catalytic mechanism remains the same, and the methane production appeared to be first order with respect to the water vapor. Only methane was produced under the reaction conditions studied using alkali or calcium catalysts. (BLM)

53359 **Computerized pyrolysis mass spectrometry of coal maceral concentrates.** Meuzelaar, H.L.C.; Harper, A.M.; Pugmire, R.J. (Univ. of Utah, Salt Lake City). *Preprints of Papers - American Chemical Society, Division of Fuel Chemistry;* **28**: No. 1, 97-102(1983). (CONF-830303—). Contract FG22-80PC30242.

From 185. American Chemical Society national meeting; Seattle, WA, USA (20 Mar 1983).

Curie-point pyrolysis mass spectrometry (Py-Ms) technique was used to characterize a set of 30 selected maceral concentrates. Seventeen of the samples originated from the maceral collection of the British National Coal Board and had been prepared by the sink/flotation method. Thirteen maceral concentrate fractions were prepared from two US coals by the cesium chloride gradient centrifugation method. It was concluded that the use of Py-MS in combination with multivariant statistical analysis provides valuable information on the specific chemical characteristics of coal maceral concentrates as well as on the influence of depositional environment and coalification processes. The results obtained appeared to agree well with generally accepted views on the chemical nature and origin of coal macerals. The presence of distinct peak patterns in the sporinites appeared to represent more or less intact (poly)isoprenoid and/or related polymeric hydrocarbon moities. (BLM)

53360 **Hydrous metal oxide ion exchangers as hydrogenation catalysts for direct coal liquefaction.** Stephens, H.P.; Bosch, R.G.; Stohl, F.V. (Sandia National Labs., Albuquerque, NM). *Preprints of Papers - American Chemical Society, Division of Fuel Chemistry;* **28**: No. 1, 148-160(1983). (CONF-830303—). Contract AC04-76DP00789.

From 185. American Chemical Society national meeting; Seattle, WA, USA (20 Mar 1983).

Preparation of a group of hydrous oxide ion exchange compounds of Ti, Zn, Nb, and Ta to be used to prepare hydrogenation catalysts by a novel synthesis route involving the exchange of active metals into these compounds has been described. The hydrogenation activity of these materials for slurry phase catalysis of direct coal liquefaction has been investigated. Initial results indicated that these catalysts show promise for potential application to coal liquefaction processes in that the initial activities of the titanates appear to be at least comparable to a commercial catalyst currently used in pilot plant liquefaction studies. (BLM)

53361 **Effect of solvent pretreatment on coal liquefaction.** Narain, N.K.; Appell, H.R.; Utz, B.R. (Pittsburgh Energy Tech. Center, PA). *Preprints of Papers - American Chemical Society, Division of Fuel Chemistry;* **28**: No. 1, 161-162(1983). (CONF-830303—).

From 185. American Chemical Society national meeting; Seattle, WA, USA (20 Mar 1983).

Research on the chemical and physical phenomena occurring between coal and solvents prior to the onset of the major liquefaction (bond breaking) step, particularly those phenomena that occur readily at temperatures below 200°C and have an effect on the subsequent liquefaction reactions, are described. Previously reported experiments had indicated that small but experimentally significant increases in coal conversion could be obtained by heating the coal-solvent slurry for 1 hour at 200°C prior to liquefaction. The solvents selected for pretreatment studies were quinoline, 1-methylnaphthalene, tetrahydrofuran, and cyclohexane. (BLM)

53362 **Ash level meter for a fixed-bed coal gasifier.** Fasching, G.E. US Patent Application 6-434,021. 12 Oct 1982. 22p.

An ash level meter for a fixed-bed coal gasifier is provided which utilizes the known ash level temperature profile to monitor the ash bed level. A bed stirrer which travels up and down through the extent of the bed ash level is modified by installing thermocouples to measure the bed temperature as the stirrer travels through the stirring cycle. The temperature measurement signals are transmitted to an electronic signal process system by an FM/FM telemetry system. The processing system uses the temperature signals together with an analog stirrer position signal, taken from a position transducer disposed to measure the stirrer position to compute the vertical location of the ash zone upper boundary. The circuit determines the fraction of each total stirrer cycle time the stirrer-derived bed temperature is below a selected set point, multiplies this fraction by the average stirrer signal level, multiplies this result by a appropriate constant and adds another constant such that a 1 to 5 volt signal from the processor corresponds to a 0 to 30 inch span of the ash upper boundary level. Three individual counters in the processor store clock counts that are representative of: (1) the time the stirrer temperature is below the set point (500°F), (2) the time duration of the corresponding stirrer travel cycle, and (3) the corresponding average stirrer vertical position. The inputs to all three counters are disconnected during any period that the stirrer is stopped, eliminating corruption of the measurement by stirrer stoppage. 7 figures.

53363 **Modulated control system for improved regulation in on/off mode automatic controllers.** Fasching, G.E. US Patent Application 6-420,051. 20 Sep 1982. 17p.

A modulated control system is provided for improving regulation of the bed level in a fixed-bed coal gasifier into which coal is fed from a rotary coal feeder. A nuclear bed level gauge using a cobalt source and an ion chamber detector is used to detect the coal bed level in the gasifier. The detector signal is compared to a bed level set point signal in a primary controller which operates in proportional/integral modes to produce an error signal. The error signal is modulated by the injection of a triangular wave signal of a frequency of about 0.0004 Hz and an amplitude of about 80% of the primary deadband. The modulated error signal is fed to a triple-deadband secondary controller which jogs the coal feeder speed up or down by on/off control of a feeder speed change driver such that the gasifier bed level is driven toward the set point while preventing excessive cycling (oscillation) common in on/off mode

automatic controllers of this type. Regulation of the bed level is achieved without excessive feeder speed control jogging. 3 figures.

53364 **Metallurgical study of a failed heat exchanger in a H-coal/sup (R)/ pilot plant.** Gray, R.J. (Oak Ridge National Lab., TN); Keiser, J.R.; DeVan, J.H.; Searles, R. *Microstructural Science;* 10: 183-193(1982). Contract W-7405-ENG-26.

On September 20, 1980, operation of the pilot plant was interrupted when a heat exchanger (a reactor effluent vapor/steam thermo syphon reboiler) failed. Three alloy 800 (Fe-32Ni-21Cr) tubes in the bottom return section (cold end) of the heat exchanger blew out of the tubesheet. The system was shut down and a team of investigators began an intense study to determine the cause of the failure. Purpose of the investigation was to determine if the failure was an isolated incident, so that the affected tubes could be plugged and the system continue to operate, or if the failures were more generic so as to require corrective action. After careful examination of the fractured tubes by optical and scanning electron microscopy, a conclusion was made that stress corrosion cracking originating at the exterior surface was the cause of the failure. Other tubes were found that were approaching a state of failure. Photographs of the heat exchanger and photomicrographs of microstructures that supported this study are presented. As the result of the investigation, remedial steps were taken by the plant operator to return the heat exchanger to line operation.

0106 Properties

REFER ALSO TO CITATION(S) 53342, 53359, 53393, 53399, 53428

53365 (ARL/TR—050, pp 142-143) **Radiological impact of the operation of coal-fired power stations within Australia.** Cooper, M.B.; Leith, I.S. Jan 1983. NTIS (US Sales Only), PC A08/MF A01.

In Annual review of research projects 1981.

Typical results for the radionuclide content of New South Wales coal and coal ash samples are presented. Concentrations of Pb-210, Ra-226, U-238, Th-228, Ra-228 and K-40 are given.

53366 (DOE/ET/14880—T4) **Kinetics and mechanism of catalytic hydroprocessing of components of coal-derived liquids. Sixteenth quarterly report, February 16, 1983-May 15, 1983.** Gates, B.C.; Olson, H.H.; Schuit, G.C.A.; Stiles, A.B.; Petrakis, L. (Delaware Univ., Newark (USA). Dept. of Chemical Engineering; Gulf Research and Development Co., Pittsburgh, PA (USA)). 22 Aug 1983. Contract AC22-79ET14880. 33p. NTIS, PC A03/MF A01. Order Number DE83016978.

A new method of structural analysis is applied to a group of hydroliquefied coal samples. The method uses elemental analysis and NMR data to estimate the concentrations of functional groups in the samples. The samples include oil and asphaltene fractions obtained in a series of hydroliquefaction experiments, and a set of 9 fractions separated from a coal-derived oil. The structural characterization of these samples demonstrates that estimates of functional group concentrations can be used to provide detailed structural profiles of complex mixtures and to obtain limited information about reaction pathways. 11 references, 1 figure, 7 tables.

53367 (DOE/MC/19210—1453) **Computed tomography of coals. Quarterly technical progress report No. 2, November 28, 1982-March 6, 1983.** Maylotte, D.H.; Kosky, P.G.; Spiro, C.L.; Lamby, E.J. (General Electric Co., Schenectady, NY (USA). Corporate Research and Development Center). 1983. Contract AC21-82MC19210. 66p. NTIS, PC A04/MF A01. Order Number DE83016869.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

X-ray computed tomography (CT) is a non-destructive, non-invasive technique now being used to investigate the internal structures of coal. In a series of experiments a General Electric CT/T model 8800 x-ray scanner was used to obtain x-ray images of numerous pieces of coal ranging in rank from lignite to bituminous. The analysis of these images is now underway. A theoretical explanation is given for the CT numbers associated with the organic fraction of coal and for a number of common minerals. It is also shown that the CT technique has the density resolution to distinguish between the different major maceral classes in coal. Preliminary analysis suggests that the CT technique has advantages over normal x-ray methods for determining the ash content of coals. The work covered in this period is designed to provide an understanding of the CT images of coal. This understanding will be used in future tasks to follow the behavior of coal during destructive processes such as pyrolysis and gasification. 7 references, 39 figures, 8 tables.

53368 (DOE/MC/19314—1474) **Differential optical absorption techniques for diagnostics of coal gasification. Technical progress report, April-June 1983.** (Mississippi State Univ., Mississippi State (USA). MHD Energy Center). Aug 1983. Contract AC21-82MC19314. 13p. NTIS, PC A02/MF A01. Order Number DE83018000.

The application of differential optical absorption (DOA) techniques for the in-situ determination of the chemical composition of coal gasification process streams is investigated. Absorption spectra of relevant molecular species and the temperature and pressure effects on DOA-determined spectral characteristics of these species will be determined and cataloged. A system will be configured, assembled, and tested. 10 references, 1 figure.

53369 (DOE/PC/30222—T3) **Macromolecular structural changes in bituminous coals during extraction and solubilizatio. Final technical report, September 1, 1980-August 31, 1983.** Peppas, N.A.; Lucht, L.M.; Hill-Livense, M.E.; Hooker, D.R. (Purdue Univ., Lafayette, IN (USA). School of Chemical Engineering). 1983. Contract FG22-80PC30222. 382p. NTIS, PC A17/MF A01. Order Number DE83017760.

Portions are illegible in microfiche products.

The macromolecular structure of coals was investigated via equilibrium and dynamic solvent swelling experiments. The values of the effective molecular weight between crosslinks and number of repeating units between crosslinks, the amount of crosslinking due to hydrogen bonding, and the effect on the network structure of temperature changes, oxidation, extraction with pyridine and removal of hydrogen bonds via methylation of hydroxyl and carboxylic groups were determined. This report consists of the following three parts: (1) macromolecular network structure of coal-interpretation of equilibrium and dynamic swelling experiments; (2) analysis of fractions obtained from coal solubilization; and (3) analysis of molecular weight distribution of coal extracts and coal derived liquids. Numerous figures, tables and references are provided for each part.

53370 (DOE/PC/40789—T7) **Thermal and radiative properties of coal-ash deposits. Technical progress report No. 7, June 1, 1983-August 31, 1983.** Anderson, D.W.; Vader, D.T.; Zumbrunnen, D.A.; Incropera, F.P.; Viskanta, R. (Purdue Univ., Lafayette, IN (USA). School of Mechanical Engineering). 1983. Contract FG22-81PC40789. 12p. NTIS, PC A02/MF A01. Order Number DE83017687.

Highlights of work accomplished during the quarter are summarized under the headings: high temperature test facility (HTTF); effective conductance of particulate deposits; and measurement of radiative properties. Some of the highlights are: the central flux calorimeter in the test cell assembly was enlarged to provide more accurate measurements over a larger range of bent flux; multiple chromel-alumel thermocouple probes were used to measure surface and internal temperatures in the ash deposit and the effective thermal conductance as a function of hot surface temperature and also of the average of both surface temperature are presented in a graph; eight experiments were completed using the improved test cell for the low temperature kiln; a computer model was developed that can predict the conductance for the particular and solid porous materials tested; assembly of the radiative property measurement facility has begun.

53371 (LBL—15869) Identification and separation of the organic compounds in coal-gasification condensate waters. Mohr, D.H. Jr.; King, C.J. (Lawrence Berkeley Lab., CA (USA)). Aug 1983. Contract AC03-76SF00098. 138p. NTIS, PC A07/MF A01. Order Number DE83017520.

Thesis.

A substantial fraction of the organic solutes in condensate waters from low-temperature coal-gasification processes are not identified by commonly employed analytical techniques, have low distriution coefficients (K/sub C/) into diisopropyl ether (DIPE) or methyl isobutyl ketone (MIBK), and are resistant to biological oxidation. These compounds represent an important wastewater-treatment problem. Analytical techniques were developed to detect these polar compounds, and the liquid-liquid phase equilibria were measured with several solvents. A high-performance liquid - chromatography (HPLC) technique was employed to analyze four condensate-water samples from a slagging fixed-bed gasifier. A novel sample-preparation technique, consisting of an azeotropic distillation with isopropanol, allowed identification of compounds in the HPLC eluant by combined gas chromatography and mass spectrometry. 5,5-dimethyl hydantoin and related compounds were identified in condensate waters for the first time, and they account for 1 to 6% of the chemical oxygen demand (COD). Dimethyl hydatoin has a K/sub D/ of 2.6 into tributyl phosphate (TBP) and much lower K/sub D/ values into six other solvents. It is also resistant to biological oxidation. Phenols (59 to 76% of the COD), dihydroxy benzenes (0.02 to 9.5% of the COD), and methanol, acetonitrile, and acetone (15% of the COD in one sample) were also detected. Extraction with MIBK removed about 90% of the COD. MIBK has much higher K/sub D/ values than DIPE for dihydroxy benzenes. Chemical reactions occurred during storage of condensate-water samples. The reaction products had low K/sub D/ values into MIBK. About 10% of the COD had a K/sub D/ of nearly zero into MIBK. These compounds were not extracted by MIBK over a wide range of pH. 73 references, 6 figures, 35 tables.

53372 (LBL—16448) Phase equilibria for complex fluid mixtures. Prausnitz, J.M. (Lawrence Berkeley Lab., CA (USA)). Apr 1983. Contract AC03-76SF00098. 21p. (CONF-8304116—2). NTIS, PC A02/MF A01. Order Number DE83017522.

From 3. international conference on fluiid properties and phase equilibria for chemical process design; Atlanta, GA, USA (10 Apr 1983).

Portions are illegible in microfiche products.

After defining complex mixtures, attention is given to the canonical procedure used for the thermodynamics of fluid mixtures: first, we establish a suitable, idealized reference system and then we establish a perturbation (or excess function) which corrects the idealized system for real behavior. For complex mixtures containing identified components (e.g. alcohols, ketones, water) discussion is directed at possible techniques for extending to complex mixtures our conventional experience with reference systems and perturbations for simple mixtures. Possible extensions include generalization of the quasi-chemical approximation (local compositions) and superposition of chemical equilibria (association and solvation) on a physical equation of state. For complex mixtures containing unidentified components (e.g. coal-derived fluids), a possible experimental method is suggested for characterization; conventional procedures can then be used to calculate phase equilibria using the concept of pseudocomponents whose properties are given by the characterization data. Finally, as an alternative to the pseudocomponent method, a brief introduction is given to phase-equilibrium calculations using continuous thermodynamics.

53373 Chemistry and structure of coals: air oxidation studies related to fluidized bed combustion. Fuller, E.L. Jr.; Smyrl, N.R.; Smithwick, R.W. III; Daw, C.S. (Oak Ridge Y-12 Plant, TN). *Preprints of Papers - American Chemical Society, Division of Fuel Chemistry;* **28**: No. 1, 44-48(1983). (CONF-830303—). Contract W-7405-ENG-26.

From 185. American Chemical Society national meeting; Seattle, WA, USA (20 Mar 1983).

Examples of uses of the Diffuse Reflectance Infrared Fourier Transform (DRIFT) to rank coals with respect to the hydroxyl content and hydrocarbon type and content for unweathered powders are presented. The technique has also been used to discern the changes in coal due to oxidation. (BLM)

53374 Some variations of properties of coal macerals elucidated by density gradient separation. Dyrkacz, G.R.; Bloomquist, C.A.A.; Ruscic, L.; Horwitz, E.P. (Argonne National Lab., IL). *Preprints of Papers - American Chemical Society, Division of Fuel Chemistry;* **28**: No. 1, 93-96(1983). (CONF-830303—). Contract W-31-109-ENG-38.

From 185. American Chemical Society national meeting; Seattle, WA, USA (20 Mar 1983).

Density gradient centrifugation (DGC) was used to separate samples of a high volatile B bituminous coal, PSOC-106, into its components in a continuous aqueous CsCl density gradient. Data are presented showing the distribution of the pure maceral particles as a function of density for the PSOC-106 and the corresponding H/C, S/C, N/C, and O/C ratios for the coal. Substantial variation in the chemical behavior of the macerals has been shown for a number of coals. (BLM)

53375 Application of 2-D and dipolar dephasing ^{13}C NMR techniques to the study of structural variations in coal macerals. Pugmire, R.J.; Woolfenden, W.R.; Mayne, C.L.; Karas, J.; Grant, D.M. (Univ. of Utah, Salt Lake City). *Preprints of Papers - American Chemical Society, Division of Fuel Chemistry;* **28**: No. 1, 103-117(1983). (CONF-830303—). Contract AC02-78ER05007.

From 185. American Chemical Society national meeting; Seattle, WA, USA (20 Mar 1983).

Data are reported for characterizing a series of whole coal macerals using conventional cross-polarization magic angle sample spinning nuclear magnetic resonance spectroscopy (CP/MAS C-13 NMR), dipolar dephasing, and 2-D dipole dephasing techniques. These data provided much new structural information and demonstrate that multiple pulse and 2-D spectroscopic techniques can be used on complex carbonaceous materials. Data obtained on maceral samples separated by the density gradient centrifugation method are also reported. (BLM)

53376 Electron spin resonance of isolated coal macerals: a preliminary survey. Silbernagel, B.G. (Exxon Research and Engineering Co., Linden, NJ); Gebhard, L.A.; Dyrkacz, G.R. *Preprints of Papers - American Chemical Society, Division of Fuel Chemistry;* **28**: No. 1, 118-124(1983). (CONF-830303—).

From 185. American Chemical Society national meeting; Seattle, WA, USA (20 Mar 1983).

Thirty-seven samples from 16 coals of the Pennsylvania State University coal data base were examined by electron spin resonance (ESR) technique. Data were recorded from very small (~ 10 mg) samples of fractions separated by isopycnic density gradient centrifugation of small coal particles in an aqueous CsCl density gradient. The ESR survey of carbon radicals in the separated macerals shows that each maceral type exhibits characteristic carbon radical properties. The radical intensities varied widely and were not related to physical density. The intensities were found to be reasonably similar within a given coal but varied significantly from one coal to the next. (BLM)

53377 Premaceral contents of peats correlated with proximate and ultimate analysis. Cohen, A.D.; Andrejko, M.J. (Univ. of south Carolina, Columbia). *Preprints of Papers - American Chemical Society, Division of Fuel Chemistry;* **28**: No. 1, 125-130(1983). (CONF-830303—).

From 185. American Chemical Society national meeting; Seattle, WA, USA (20 Mar 1983).

Preliminary correlations of petrographic characteristics of peats (i.e., peat types, premaceral proportions, and premaceral types) with proximate analysis, ultimate analysis, and Btu content are reported. These correlations suggest the following trends: (1) peats with the highest proportions of birefringent macerals tend to have highest volatile matter (and H and O contents); (2) fluorescence of macerals seems to correlate only slightly with proximate and ultimate analyses; (3) higher previtrinite contents tend to correlate with higher volatile matter contents; (4) peats with higher preinertinities, prephlobaphenites (and precorpocollinites), and presclerotinites have the highest fixed carbon; and (5) Btu correlates strongly with ash content and only slightly with maceral content. (BLM)

53378 **Reactivity and characterization of coal macerals.** Winans, R.E.; Hayatsu, R.; Scott, R.G.; McBeth, R.L. (Argonne National Lab., IL). *Preprints of Papers - American Chemical Society, Division of Fuel Chemistry;* **28**: No. 1, 131-136(1983). (CONF-830303—). Contract W-31-109-ENG-38.

From 185. American Chemical Society national meeting; Seattle, WA, USA (20 Mar 1983).

In a study of the reactivity and characterization of coal maceral, the maceral concentrates were pyrolyzed in a vacuum and the resulting products collected and characterized by gas chromatography (GC)- mass spectrometry and by GC microwave plasma emission spectroscopy. Experiments indicated that secondary reactions such as aromatization of alicyclics are less likely to take place under vacuum conditions, and better quantitative data were obtained with the batch reaction scheme used in the work reported here. The data are discussed as they define certain elemental or petrographic properties of the macerals. It was tentatively concluded that sporinite and vitrinites of the same rank have very similar structures but vary in the mix of aliphatics and aromatics while the structures in inertinites are very different. (BLM)

53379 **Influences of macerals on the hydrogen-deuterium exchange reaction between tetralin and diphenylmethane.** Choi, C.; Stock, L.M. (Univ. of Chicago, IL). *Preprints of Papers - American Chemical Society, Division of Fuel Chemistry;* **28**: No. 1, 137-140(1983). (CONF-830303—). Contract AC22-80PC30088.

From 185. American Chemical Society national meeting; Seattle, WA, USA (20 Mar 1983).

The samples used for the comparison of the influence of maceral concentrates on the exchange reactions between tetralin-d_{12} and diphenylmethane were prepared by density gradient centrifugation or float-sink techniques. The highly purified macerals selectively enhanced the rate of exchange reaction at the benzylic position of tetralin-d_{12}. The order of reactivity, exinites > vitrinites> inertinites, was clearly established for the macerals of the PSOC-106 coal. Generally the same reactivity was noted for the less pure macerals obtained from PSOC-828 and PSOC-1103 coals, but the differences in reactivity were less sharply defined. (BLM)

53380 **Effect of thermal alteration on petrographic constituents of the Hanna No. 1 coal.** Rich, F.J. (South Dakota School of Mines and Tech., Rapid City); Youngberg, A.D. *Preprints of Papers - American Chemical Society, Division of Fuel Chemistry;* **28**: No. 1, 141-147(1983). (CONF-830303—).

From 185. American Chemical Society national meeting; Seattle, WA, USA (20 Mar 1983).

Results of a study designed to construct a geothermometer based upon thermal alterations in the organic constituents of Hanna No. 1 coal lying within the Paleocene Hanna Formation and carbonaceous shale samples are presented. The samples were observed microscopically and determinations were made as to the maximum temperature to which the sediments has been subjected. The organic constituents of the samples (macerals) were observed described, and quantified as changes occurred in their appearance during heating at progressively higher temperatures. Direct petrographic changes were noted to take place in the Hanna No. 1 samples during heating. Decreasing abundances of fluorescence macerals, increasing vesicularity and cracking in vitrinites, and eventual elimination of all organic constituents except vitrinite could be correlated with temperature ranges. The liptinites reacted earlier than the vitrinites, and this information could have important implications as far as optimum gas composition and production are concerned. (BLM)

53381 **Analysis of lignite liquefaction products processed with syngas and hydrogen sulfide.** Farnum, B.W.; Farnum, S.A.; Bitzan, E.F. (Grand Forks Energy Tech. Center, ND). *Preprints of Papers - American Chemical Society, Division of Fuel Chemistry;* **28**: No. 1, 163-167(1983). (CONF-830303—).

From 185. American Chemical Society national meeting; Seattle, WA, USA (20 Mar 1983).

A method for monitoring the presence of elemental and organic sulfur compounds in distillable low-rank coal liquefaction products utilizing column chromatography and dual detection (FID/FPD) capillary GC has been developed. The addition of H_2S to the continuous processing of Beulah, ND lignite does not increase the amount or variety of sulfur-containing organic compounds in the recycle slurry ASTM-D1160 vacuum distillate products. It does, however, introduce sulfur and a variety of volatile sulfur-containing organics into the light oils condensed from the vapor phase in the reactor. The presence and variety of sulfur compounds after 12 to 14 reactor passes reflect the introduction of these components on the startup solvent. No increased mutagenicity was observed with the coal liquids processed with H_2S. The production of H-donors in the recycle slurry ASTM D-1160 distillates was enhanced by the presence of H_2S.

53382 **System for analyzing coal-liquefaction products.** Dinsmore, S.R.; Mrochek, J.E. US Patent Application 6-437,782. 29 Oct 1982. 12p. Contract W-7405-ENG-26.

A system for analyzing constituents of coal-derived materials comprises three adsorption columns and a flow-control arrangement which permits separation of both aromatic and polar hydrocarbons by use of two eluent streams. 4 figures.

0108 Waste Management

REFER ALSO TO CITATION(S) 53349, 53428, 54299, 54905

53383 **(AD-P—000772/4) Treatment of coke plant wastewaters in packed bed reactors.** Olthof, M.; Oleszkiewicz, J.; O'Donnell, W.R. (Duncan, Lagnese and Associates, Inc., Pittsburgh, PA (USA). Industrial Waste Section). 1982. 18p. NTIS, PC A02/MF A01.

The work presented in this paper describes the results of a treatability study of wastewaters originating from a benzol plant in an upflow biotower (UBT). The wastewater constituents are the same as for coke oven wastewater, except that most of the constituents are present in some-what lower concentrations. The biotower used in this study is a biological treatment process developed by the Leopold Company and operates more or less like a reversed flow trickling filter. The tower is packed with random plastic medium, the influent flows upward and air is supplied by aeration through a filter underdrain system. This paper will present the results of the treatability of benzol plant wastewater in this reactor. The main purpose of this study was to determine the loading at which the phenol was virtually completely removed from the influent. The data obtained in this study will be compared with studies performed by other researchers with similar wastewater in activated sludge and with other types of fixed film reactors.

53384 **(DOE/ET/15295—T1) Engineering/economic analysis of coal preparation with flue gas desulfurization for keeping higher sulfur coals in the energy market.** Hoffman, L.; Jones, M.V. (Hoffman-Holt, Inc., Silver Spring, MD (USA)). Feb 1982. Contract AC01-80ET15295. 315p. NTIS, PC A14/MF A01. Order Number DE83017331.

Portions are illegible in microfiche products.

In order to determine the relative economics of meeting environmental standards via physical coal cleaning combined with partial flue gas desulfurization (FGD) versus full-scale FGD, consideration must be given to the factors influencing the costs and benefits of each approach. For physical coal cleaning, the costs are dependent upon such factors as coal composition and plant size/cost. Offsetting these costs are the benefits of using cleaned coal. The magnitude of these benefits is influenced by the increased heat content of the processed product brought on by the removal of some of the low heat content impurities. In the case of flue gas desulfurization (FGD), costs are influenced by SO_2 concentration and amount of flue gas treated. The considered cost/benefit factors are discussed according to three categories: (1) cost of cleaning coal; (2) benefits of using cleaned coal; and (3) cost of flue gas desulfurization. The cost assessments of FGD combined with coal cleaning as compared to FGD used alone indicated savings as high as 70 percent to an additional 3 percent cost as compared to flue gas desulfurization alone when applied to new steam coal utilities. The results are even more impressive for existing plants, where study assessments indicated a 15 percent to 91 percent savings for physical cleaning followed by FGD as compared with FGD alone. 15 references, 12 figures, 7 tables.

53385 **(DOE/ET/17093—1471) Testing and verification of granular-bed filters for the removal of particulate and alkalis. Tenth quarterly project report, January 1-March 31, 1983.** Lippert, T.E. (Westinghouse Electric Corp., Pittsburgh, PA (USA)). 1983. Contract AC21-80ET17093. 43p. NTIS, PC A03/MF A01. Order Number DE83017966.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The Westinghouse Electric Corporation with Ducon, Inc. and Burns and Roe, Inc. are conducting a test and evaluation program of a Granular-Bed Filter (GBF) for gas-cleaning applications in pressurized-fluidized-bed combustion processes. This work is funded by DOE PRDA for Exploratory Research, Development, Testing and Evaluation of Systems or Devices for Hot Gas Clean-up. This report describes the status of the testing of the subpilot scale GBF unit under simulated Pressurized-Fluidized-Bed Combustion (PFBC) conditions through Phase IV. 9 references, 21 figures, 4 tables.

53386 **(DOE/FC/10492—T1) Reactivity of fly ashes in a spray dryer FGD process.** Davis, W.T.; Reed, G.D. (Tennessee Univ., Knoxville (USA). Dept. of Civil Engineering). 1 May 1983. Contract AC18-81FC10492. 90p. NTIS, PC A05/MF A01. Order Number DE83017534.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

During the period 1981-1982, a study was performed to determine the ability of various fly ashes to retain sulfur dioxide in a pilot plant spray dryer/fabric filter flue gas desulfurization system. This knowledge would provide design engineers with the necessary data to determine whether the fly ash from a particular utility could be used as an effective supplement or substitute for slaked lime in a spray dryer system. The study commenced with the collection of 22 fly ashes from lignite, subbituminous, and bituminous eastern and western coals. The ashes were contacted with the flue gas entering the pilot plant by two different techniques. In the first, the ashes were slurried in water and injected into the spray dryer through a spinning disk atomizer. In the second, the ashes were injected as a dry additive into the flue gas upstream of the spray dryer. Analyses were conducted to determine the ability of each ash to retain sulfur dioxide in the system followed by statistical correlations of the sulfur retention with the physical/chemical properties of each ash. 17 references, 32 figures, 19 tables.

53387 **(IS-M—426) Mineral recovery from coal-conversion solid wastes.** Burnet, G.; Harnby, N. (Ames Lab., IA (USA); Bradford Univ. (UK). Dept. of Chemical Engineering). 1982. Contract W-7405-ENG-82. 10p. (CONF-8210188—1). NTIS MF A01. Order Number DE83017674.

From European Federation of Chemical Engineers conference on energy; London, UK (12 Oct 1982).

Microfiche only, copy does not permit paper copy reproduction. Original copy available until stock is exhausted.

The utilization or disposal of coal conversion solid wastes is an important environmental problem of the future. Work is described on the development of two processes for the large scale extraction of Al, Ti, and Fe from these wastes. Such processes not only appreciably reduce the disposal problem but also provide an indigenous source of valuable metals. One process involves the production of soluble aluminates in the clinker resulting from a lime-fly ash sinter and the other is a high temperature chlorination process that converts the metal oxides in the ash to volatile metal chlorides. Work is proceeding from bench scale up to large scale feasibility studies.

53388 **(PB—83-207480) Coal combustion waste leachate scaling. Final report, July 1981-June 1982.** Stanbro, W.D.; Lenkevich, M.J. (Johns Hopkins Univ., Laurel, MD (USA). Applied Physics Lab.). May 1983. 52p. NTIS, PC A04/MF A01.

A study has been conducted on simulated utility coal combustion waste leachates in order to determine the sensitivity of laboratory column leaching tests to variations in liquid phase/solid phase contact time. This was done to provide insight into the possible errors involved in scaling laboratory results to field situations. The materials tested were fly ash and a gypsum/fly ash mixture which simulates co-disposal of fly ash and forced air oxidized scrubber sludge. The constituents tested were calcium, sulfate, arsenic and selenium. In most cases studied contact time had little effect on the contaminant concentration on the leachate. In those instances where contact time had a statistically significant effect, the half time of the approach to equilibrium appears to be less than a half an hour. An experimental design providing a contact time of a few hours should give an adequate representation of the equilibrium release.

53389 **(PB—83-214734) Control technology appendices for pollution control technical manuals. Final report, June 1982-February 1983.** (TRW, Inc., Redondo Beach, CA (USA)). Apr 1983. 762p. NTIS, PC A99/MF E03.

The document is one of six technical handbooks prepared by EPA to help government officials granting permits to build synfuels facilities, synfuels process developers, and other interested parties. They provide technical data on waste streams from synfuels facilities and technologies capable of controlling them. Process technologies covered in the manuals include coal gasification, coal liquefaction by direct and idirect processing, and the extraction of oil from shale. The manuals offer no regulatory guidance, allowing the industry flexibility in deciding how best to comply with environmental regulations.

53390 **(PB—83-216481) Control of blackwater in coal preparation plant recycle and discharge. Open file report Oct 79-Sep 82 (final).** Rey, P.A.; Hogg, R.; Aplan, F.F. (Pennsylvania State Univ., University Park (USA)). 29 Apr 1983. 38p. NTIS, PC A03/MF A01.

Water recycle is an important part of the coal preparation process. This study was directed toward (1) a survey of current practice and an evaluation of both the solid and liquid components of blackwater, (2) an experimental study of blackwater flocculation, and (3) a fundamental analysis of the flocculation process. More fundamental studies were made that clearly indicate the need for controlled mixing of polymer into the suspension to be flocculated and the need to evaluate more closely the structure of the flocs formed during the process.

53391 **(PB—83-238683) Full-scale utility FGD (flue gas desulfurization) system adipic acid demonstration program. Volume 1. Process results. Final report Jun 80-Nov 82.** Hargrove, O.W. Jr; Colley, J.D.; Glover, R.L.; Owen, M.L. (Radian Corp., Austin, TX (USA)). Jun 1983. 390p. (RAD—82-213-012-36-VOL-1). NTIS, PC A17/MF A01.

The report culminates a series of projects sponsored by the EPA, investigating the use of adipic acid as an additive to enhance SO_2 removal in aqueous flue gas desulfurization (FGD) systems, using limestone reagent. A 9-month program at the 194-MW Southwest Power Plant (SWPP) of City Utilities, Springfield, MO, demonstrated the effectiveness of adipic acid and dibasic acids (the latter, by-products of the production of adipic acid). The program examined the effect of adipic acid addition on a limestone FGD system under natural and forced-oxidation modes of operation.

53392 **(PB—83-238691) Full-scale utility FGD (flue gas desulfurization) system adipic acid demonstration program. Volume 2. Continuous emissions monitoring results. Final report Jun 80-Nov 82.** Hargrove, O.W. Jr.; Colley, J.D.; Glover, R.L.; Owen, M.L. (Radian Corp., Austin, TX (USA)). Jun 1983. 599p. (RAD—82-213-012-36-VOL-2). NTIS, PC A25/MF A01.

The report culminates a series of projects sponsored by the EPA, investigating the use of adipic acid as an additive to enhance SO_2 removal in aqueous flue gas desulfurization (FGD) systems, using limestone reagent. A 9-month program at the 194-MW Southwest Power Plant (SWPP) of City Utilities, Springfield, MO, demonstrated the effectiveness of adipic acid and dibasic acids (the latter, by-products of the production of adipic acid). The program examined the effect of adipic acid addition on a limestone FGD system under natural and forced-oxidation modes of operation.

53303 **(UCRL—53336) Kinds and quantities of organic combustion products in solid and liquid wastes from a coal-fired power station.** Harrison, F.L.; Bishop, D.J.; Mallon, B.J. (Lawrence Livermore National Lab., CA (USA)). Aug 1983. Contract W-7405-ENG-48. 46p. NTIS, PC A03/MF A01. Order Number DE83018069.

Organic compounds recovered from solid and liquid wastes from the Four Corners Coal-Fired Power Station at Fruitland, New Mexico, were analyzed. Total organic carbon, total extractable hydrocarbons, and identities and quantities of aliphatic and aromatic hydrocarbons are reported. Organic constituents in water and particulate samples were extracted into organic solvents and characterized by gas chromatography (GC) and gas chromatography, mass spectrometry (GC MS). In addition, concentrations of inorganic elements and ions present in the scrubber water and in the acid-soluble fraction of particulate material in and nearby the Four Corners Plant were determined. Organic compounds in acidic, basic, and neutral fractions of extracts of liquid waste were low in molecular weight and included alkanes, alcohols, ketones, and phthalates. Organic constituents in extracts of solid waste included large numbers of aliphatic and aromatic compounds. A series of normal C_{18} to C_{30} paraffins was found in the aliphatic fractions. The aromatic fractions contained compounds of one, two, three, and four rings. No compounds containing more than four rings were identified. However, our studies on recovery of radiolabeled naphthalene and benzo(a)pyrene added to scrubber fly ash indicate that polynuclear aromatic hydrocarbons containing more than four rings are poorly recovered, and absence of these compounds in the GC MS analysis does not imply that they are not present in the sediment. Comparison of organic constituents in extracts of fly ash from the wet scrubber and the electrostatic precipitator was made. Large numbers of compounds were identified; few were common to both extracts. 14 references, 5 figures, 19 tables.

0109 Environmental Aspects

REFER ALSO TO CITATION(S) 53349, 53351, 53365, 53411, 53418, 53425, 54888, 54916

53304 **(DOE/ID/01740—T1) National Environmental Research Areas: FOCI for integrated research in western energy resource regions. A feasibility study report.** Jewell, S.R. (Wyoming Univ., Laramie (USA)). Dec 1978. Contract AS07-78ID01740. 44p. NTIS, PC A03/MF A01. Order Number DE83017680.

Portions are illegible in microfiche products.

A feasibility study to determine the problems and benefits of establishing a National Environmental Research Park/Area in the Rocky Mountain Overthrust Belt of Idaho, Utah, and Wyoming, and/or the Powder River Basin of Wyoming and Montana has been completed. The study was performed with the support of a group of universities interested in a consortium to develop, manage, and coordinate research in the Park/Area, provide a physical definition of the Park, prepare methods of funding both the research and the consortium, and present an exemplary research program. The results of the study have been positive, and have given additional insight into the formation of National Environmental Research Parks/Areas that was not foreseen at the inception of the study. Therefore, a recommendation is made to establish National Environmental Research Areas (NERA's) (in lieu of Research Parks) which will facilitate formation and reduce the time requirement. Two exemplary research programs have been selected. One involves environmental baseline information collection and interpretation related to oil and gas development in the Rocky Mountain Overthrust Belt of Wyoming, Utah, and Idaho. The second is a study of the hydrological impacts of in situ fossil fuel or uranium recovery of the Powder River Basin.

53305 **(PB—83-191569) Reduction of land recontouring costs. Volume I. Texas lignite field. Open file report Sep 78-Jan 81.** Howland, J.W.; Russell, L.W. (Russell and Sons Construction Co., Inc., Eureka, KS (USA)). Sep 1981. 40p. NTIS, PC A03/MF A01.

To determine their effectiveness in different climate and soil conditions, a demonstration of dozer blades specifically designed for recontouring mine spoil was conducted at an east Texas surface coal mine. The specialized equipment included a 48-ft angle blade, a modified 24-ft 'U' blade, a 13-ft deep 'U' blade, and a 24-ft grading bar. Both the 48- and 24-ft 'U' blades were mounted in a two-tractor, single-operator configuration. To meet flotation problems common in this mining region, a 22-ft lightweight blade was developed and demonstrated for use on a 400-to-430-hp tractor. The demonstration involved 1,185 acres and showed a 50% reduction in reclamation costs and a 47% reduction in fuel requirements for this mine site over conventional equipment.

53306 **(PB—83-191577) Reduction of land recontouring costs. Volume II. bituminous coal field, northeast Arizona. Open file report Feb 79-Jun 82.** Howland, J.W.; Russell, L.W. (Russell and Sons Construction Co., Inc., Eureka, KS (USA)). Jun 1982. 49p. NTIS, PC A03/MF A01.

A demonstration of dozer blades, designed for recontouring area-mined spoil and shown effective at Kansas and east Texas surface mine sites, was conducted at a northeast Arizona surface coal mine to determine their effectiveness in different climate and soil conditions. The specialized tools were: 48-ft angle blade (on side-by-side tractor), 24-ft grading bar, modified 24-ft 'U' blade (on side-by-side tractor), and a 13-ft-deep 'U' blade. Interest in the increased dirt-handling capacity of a previously built 22-ft blade, resulted in the design of a new center-flow blade of good versatility, able to maintain increased flow in otherwise difficult-to-move spoil. The demonstration involved 263 acres and showed a reduction of 50% in reclamation costs and 20% in fuel requirements for this mine site over conventional equipment.

53307 **(PB—83-200857) Coal train movements through the city of Wilmington, North Carolina.** (North Carolina Coastal Energy Impact Program, Raleigh (USA); Anderson and Associates, Inc., Blacksburg, VA (USA)). Oct 1982. 134p. NTIS, PC A07/MF A01.

The purpose of this study is to identify and analyze the potential economic, transportation and environmental impacts to the City of Wilmington caused by the exportation of coal through the State Port. Primary attention focuses on the effects of unit train movements. Public policy actions are recommended to reduce adverse impacts.

53308 **(PB—83-200865) Analysis of the impact of coal trains moving through Morehead City, North Carolina.** (North Carolina Coastal Energy Impact Program, Raleigh (USA)). Oct 1982. 68p. NTIS, PC A04/MF A01.

At the present time 3 million tons of coal is transported by trains through Morehead City each year. This is projected to rise to 15 million tons per year by 1984. As the tonnage of exported coal increases, the possible adverse effects on the Town of Morehead City are likely to be observed. This report examines the possibility of any adverse effects to the Town and its citizens caused by the coal train transportation. Traffic delay, noise and vibration, and business effect studies were conducted, analyzed, and conclusions drawn from these studies to assess the impacts.

0110 Reserves And Exploration

53309 **(DOE/PC/30013—10) Data base for the analysis of compositional characteristics of coal seams and macerals. Quarterly technical progress report, May-July 1982.** Davis, A.; Suhr, N.H.; Spackman, W.; Painter, P.C.; Walker, P.L.; Given, P.H.; Rimmer, S.M. (Pennsylvania State Univ., University Park (USA). Coal Research Section). Aug 1983. Contract AC22-80PC30013. 79p. NTIS, PC A05/MF A01. Order Number DE83017147.

A total of twenty-eight coal samples were collected from the Northern Great Plains and Rocky Mountain provinces. Two hundred and thirty-eight coal samples and 261 data printouts were provided to other agencies involved in coal research. Qualitative and quantitative infrared data were collected for 55 channel samples. The effects of different crystallinities in standard minerals on this type of analysis was investigated. The sixteen column samples of Herrin (No. 6) coal collected from three localities in Illinois were described in terms of their lithotype content. Methods of cluster analysis are discussed. Measurements of aliphatic C-H content by

FTIR have been correlated to the plastic properties and liquefaction behavior of a set of coals and vitrinite concentrates obtained from the Lower Kittanning seam. Certain types of structural information about coal can be obtained from physical constitution analysis. The details of two such methods are discussed. The surface areas and micropore volumes of coals varying in rank from anthracite to lignite were measured from CO_2 uptake at 298 K. CO_2 area is high for anthracitic coal. Swelling of macerals in water was studied by comparing its sorption using pycnometric and gravimetric techniques. Macerals show significant swelling in water.

0120 Mining

REFER ALSO TO CITATION(S) 53336, 53426, 54484

53400 (DOE/ET/14146—T1) Surface mining environmental monitoring and reclamation handbook. Sendlein, L.V.A.; Yazicigil, H.; Carlson, C.L. (eds.). (Southern Illinois Univ., Carbondale (USA)). 1983. Contract AC22-80ET14146. 735p. NTIS, PC A99/MF A01. Order Number DE83016681.

Portions are illegible in microfiche products.

The Surface Mining Environmental Monitoring and Reclamation Handbook has been expressly designed to meet the statutory requirements of surface coal mining and reclamation. It sets forth a range of monitoring techniques in a manner that is most likely to be of direct, practical, and cost-effective use to the widest expanse of mining-reclamation situations. A literature review identifies and evaluates those published sources of information that are most applicable to the needs of handbook users. This is supplemented by identifying other sources of pertinent information with particular attention paid to local, state, and federal agencies that can supply data required for mining and reclamation efforts. Attention is then directed toward the means whereby regulatory requirements can be satisfied. An effort has been made to identify those areas likely to present special problems. And, finally, where appropriate, modeling techniques are described and the extent of their utility delineated. Throughout, the handbook has maintained a practical focus. It attempts to provide surface coal mine operators with the tools and techniques needed to meet legal environmental and monitoring requirements without an unnecessary and costly overexpenditure of time and money. The provision of a range of alternatives to meet various obligations, the stress on using existing resources whenever possible, and the careful differentiation of means and ends are all directed toward the best ways to meet regulatory requirements.

53401 (NP—3770395) 1980 annual report of the Bavarian Mines Inspectorate. (Bayerisches Oberbergamt, Muenchen (Germany, F.R.)). 1981. 128p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83770395.

Portions are illegible in microfiche products.

Developments in 1980 differed between the various branches of mining; the greatest increase was observed in the field of petroleum. Developments outside the mining sector are reviewed as well as the organisation and responsibilities of mining authorities, safety in mining, health and safety at work, and environmental aspects of mining. There are three separate reports on specific events.

53402 (NP—3902702) Annual report of the Secretary of Labor under the Federal Mine Safety and Health Act of 1977, fiscal year 1979. Volume 1. (Department of Labor, Washington, DC (USA); Mine Safety and Health Administration, Arlington, VA (USA)). 4 Sep 1981. 90p. NTIS, PC A05/MF A01. Order Number DE83902702.

Fiscal year 1979 was the Mine Safety and Health Administrations' first full year of operation under the Federal Mine Safety and Health Act of 1977. This legislation had taken effect during the previous fiscal year, on March 9, 1978. It moved the Federal mine safety and health enforcement agency from the Department of the Interior to the Department of Labor, established its present name, and substantially broadened its role. The 1979 fiscal year saw the agency complete and consolidate many changes which the new law made necessary and which had begun during the previous year. The 1977 Act repealed the earlier Federal Metal and Nonmetallic Mine Safety Act of 1966 and amended the Federal Coal Mine Health and Safety Act of 1969 to bring metal and nonmetal (non-coal) mines under its more comprehensive provisions. As a result, four complete annual inspections became mandatory for all underground mines, coal and non-coal alike. The law also introduced a requirement of two complete annual inspections for all surface mines. Metal and nonmetal mines became subject to mandatory civil dollar penalties for violations of federal safety and health regulations, as had previously been the case in coal mining. To meet the new Act's increased inspection requirements, MSHA hired more than 300 new metal and nonmetal mine inspectors, virtually all of whom completed their training during the 1979 fiscal year. As a result, MSHA conducted nearly 50 percent more complete mandatory inspections at metal and nonmetal mines than in the previous fiscal year. Through special enforcement programs, MSHA continued to focus enforcement resources on mines with the greatest need for attention. Individual inspectors were assigned full-time to especially large, complex coal mines and to coal mines with high accident rates, poor compliance records and weak safety management systems.

53403 (NP—3902703) Annual report of the Secretary of Labor under the Federal Mine Safety and Health Act of 1977, fiscal year 1979. Volume 2. Mining health and safety research and development. (Bureau of Mines, Washington, DC (USA). Div. of Minerals Health and Safety Technology). 1979. 147p. NTIS, PC A07/MF A01. Order Number DE83902703.

As a consequence of the peculiar and hazardous occupational conditions miners face, and in recognition of modern social values, Congress has passed reform laws intended to set forth a comprehensive code for health and safety protection in US mines. It is because of these laws that the Bureau has been able to advance its in-house and contract research program, and to provide technological support to those charged with writing and enforcing mine standards. This report presents the Bureau's most recent progress. Primary attention is focused on those technology developments that can improve the health and safety of miners. Report organization reflects the major funding categories....coal mine and metal and nonmetal mine health and safety research. Under these categories, a concentrated overview of each program area states the relevant critical problems, the immediate programmatic research goals, and provides a synopsis of the developments in the program area of 1979. Descriptions of the most recent accomplishments are given in more detail in subsequent sections. The publications listed at the end of each section provide reference for additional technical details for individual projects. The appendices contain a complete listing of Bureau-supported mining health and safety research, both in-house and contract work. Project titles, the facilities where research is being performed, the duration of the effort, and prior and current funding are tabulated for in-house projects. Analogous information is given for all contract research.

53404 (NP—3902791) Bureau of Mines coal mining, health and safety, research and development. 1975 annual report and achievements. (Department of the Interior, Washington, DC (USA). Office of the Secretary). 1975. 104p. NTIS, PC A06/MF A01. Order Number DE83902791.

Portions are illegible in microfiche products.

The results discussed in this report reveal certain indicators on the efficacy of Bureau R and D programs in addressing the Coal Mine Health and Safety Act of 1969. Although we cannot quantify the role of research in decreasing such factors as mortality rates, the fact remains that since the Act these rates have declined. Quantifiable indicators include the number of standards promulgated using research results as a basis or guideline, improvement in compliance with standards, technical innovation as measured by patent applications and technical publications, and participation in such technology transfer activities as open industry briefings, seminars and films. A most important indicator is the steadily increasing industry involvement in Bureau programs through such avenues as cooperative agreements, cost sharing contracts, and provision of site availability for experimentation and demonstration. The increasing movement in the commercial market towards producing and using research-based hardware is another indicator of major significance. The status of the program, as reflected by these indicators, is

described covering the Bureau's administration of health and safety research activities

53406 **(NP—3902951) Annual report of the Secretary of Labor under the Federal Mine Safety and Health Act of 1977, fiscal year 1980. Volume 1.** (Department of Labor, Washington, DC (USA); Mine Safety and Health Administration, Arlington, VA (USA)). 11 Aug 1982. 68p. NTIS, PC A04/MF A01. Order Number DE83902951.

Portions are illegible in microfiche products.

Under the Federal Mine Safety and Health Act of 1977, the Mine Safety and Health Administration is responsible for protecting the health and safety for about 550,000 employees at more than 20,000 mines and associated operations across the United States. The agency issues regulations needed to guard against safety and health hazards at various types of mining operations, makes inspections of all operations under its jurisdiction, and assesses civil monetary penalties for safety and health violations as the Act requires. In addition, MSHA assists operators in complying with regulations, strengthening their safety programs and improving miner training. The agency cooperates with industry, labor, equipment manufacturers, state mine agencies, educational institutions and other members of the mining community to assure the protection of workers in this vital but hazardous industry. The 1977 Act, effective March 9, 1978, extended the Federal Coal Mine Health and Safety Act of 1969 to cover metal and nonmetal (non-coal) mining, and otherwise amended several of its provisions. MSHA inspectors made approximately 100,000 inspections during FY 1980. A total of 244 miners lost their lives in work-related accidents FY 1980. The fatal-injury rates in coal and non-coal mining each remained at the same level as in fiscal 1979, in both cases the lowest levels in US history. The rate of all reported coal mine injuries increased slightly, while the all-injury rate for metal and nonmetal mining declined by 10 percent. FY 1980 was free of major mine disasters. However, an increase in roof fall fatalities in underground coal mines during the last half of calendar 1979 caused concern and prompted MSHA to redouble its roof control efforts in cooperation with industry.

53406 **(NP—3903013) Annual report and achievements 1975.** (Department of the Interior, Washington, DC (USA). Office of the Secretary). 1975. 46p. NTIS, PC A03/MF A01. Order Number DE83903013.

This annual report reviews the activities of MESA during 1975, describing them within a framework of function (inspection, education, training, and technical assistance). These functions, in turn, are organized within two major categories - Enforcement and Services - reflecting the dual nature of MESA's approach to achieving safe and healthful mines. The status of health and safety within the nation's coal mines is summarized first, followed by discussion of particularly noteworthy achievements for each functional activity. Enforcement activities are then reported, including inspections, analysis of statistics and trends, special accident prevention programs, and penalty assessment procedures and decisions. Generally, these activities are designed to achieve compliance with health and safety regulations. However, MESA also assists the mining community in achieving safer and more healthful coal mines. Section two reviews these activities, which are reported as Services for Enforcement and Mining Community. Included are educational and training programs, information dissemination services, and technical assistance for specific mining problems.

53407 **(NP—3903014) Annual report and achievements 1976.** (Mining Enforcement and Safety Administration, Washington, DC (USA)). 1976. 59p. NTIS, PC A04/MF A01. Order Number DE83903014.

Portions are illegible in microfiche products.

Part I of this annual report presents the activities of MESA during 1976. It is organized into an introduction which discusses the status of health and safety within the nation's coal mines and summarizes MESA's more important 1976 achievements, and two sections which reflect the dual nature of MESA's approach to achieving safe and healthful coal mines. One section (Enforcement) deals with activities undertaken to enforce federal coal mine health and safety regulations, including inspections, analysis of statistics and trends, special accident prevention programs, and penalty assessments. The other (Services for Enforcement and the Mining Community) deals with such services as technical assistance, education, and training provided by MESA. In addition, a pictorial essay is dispersed throughout the report to provide a review of recent progress made in coal mining health and safety. It contrasts procedures, equipment, and techniques being used in many coal mines today with conditions existing prior to the 1969 Coal Act. It is designed to serve as a guide for what is being or could be achieved throughout the entire coal industry.

53408 **(NP—3903015) Bureau of Mines coal mining health and safety research and development. 1976 annual report and achievements.** (Department of the Interior, Washington, DC (USA). Office of the Secretary). 1976. 98p. NTIS, PC A05/MF A01. Order Number DE83903015.

Portions are illegible in microfiche products.

This part of the annual report, prepared pursuant to section 511 of the Act, highlights ome of the significant products from Bureau of Mines' coal mine health and safety research that are available for industry use. Advancements have been made in most hazard areas, and many more practical control measures, other than those mentioned herein, are expected to become available in the near future. In prior years, this annual report was prepared on a calendar year basis. To correlate research authorizations and expenditures with the changed federal fiscal year, this report and future reports will cover a fiscal year period. Part 1 of this report, which describes the activities of the Mining Enforcement and Safety Administration, will continue to report statistical indicators on a calendar year basis. Cooperative work with equipment manufactures and mine operators has continued to increase. In 1976, 45 coal companies and other organizations were active in cooperative agreements. With the continuing support of the industry, such working partnership arrangements will greatly facilitate the substantial efforts being pursued to make coal mining safer and more healthful. This report emphasizes mining research and development. However, without the balance provided by the other elements - training and inspection - much of the safety impact of the emerging technology would be lost.

53409 **(NP—3903016) Annual report and achievements 1977.** (Mining Enforcement and Safety Administration, Washington, DC (USA)). 1977. 42p. NTIS, PC A03/MF A01. Order Number DE83903016.

Portions are illegible in microfiche products.

Our commitment to mine health and safety is a strong one, for we fully believe that the right of the American worker to a safe, healthful workplace is fundamental, and that the Government's duty is to insure this right as a daily reality. The next few years will be critical in developing an energy base for this country and establishing the role coal will play in this base. As we increasingly turn to coal for the energy to sustain and simulate our economy, the safety and health of the American miner must be protected. As a result of a series of mine explosions, and the gradual realization of the magnitude of coal workers' pneumoconiosis, increase public and Congressional concern has led to a gradual increase in the federal presence and eventually to federal preeminence in the fields of coal mine health and safety. By enacting the Federal Coal Mine Health and Safety Act of 1969, Congress emphatically stated that responsibility for achieving safe and healthful working environments and practices rests with mine operators and miners. The Secretary of the Interior was assigned the responsibility for determining compliance with the Act. On March 9, 1978, these responsibilities were transferred from the Secretary of the Interior to the Secretary of Labor. Since the passage of the 1969 Act, coal mining fatalities have been reduced 47 percent, and the frequency rate of nonfatal injuries has fallen 16 percent. Although great strides have been made toward improving health and safety in the Nation's coal mines, much remains to be done. As we move to step up production of coal and minerals, death, injury, and occupational disease in the coal and noncoal mining industry will not be tolerated by the public. Enforcement of safe working practices and working conditions is our responsibility under the law, but it is the daily responsibility of industry and labor as well.

53410 **Water jet drilling of long horizontal holes in coal beds.** Barker, C.R. (Univ. of Missouri, Rolla); Timmerman, K.M. pp III.2.1-III.2.10 of Wter jet symposium. Wang, F.D.; Ozdemir, L.; Miller, R. (eds.). Golden, CO; Colorado School of Mines Press (1982). (CONF-8104201—).

From 1. US water jet symposium; Golden, CO, USA (7 Apr 1981).

Holes drilled horizontally into coal beds from a vertical hole can be used to drain methane from gassy coal prior to mining and to link vertical wells for in situ gasification. A device which uses water jets to drill these holes is being developed jointly by the University of Missouri-Rolla and the Sandia National Laboratories. Earlier papers have described the first generation equipment which was capable of drilling a horizontal hole 50 feet in length from a vertical borehole. This paper will describe the second generation equipment which is intended to drill horizontal holes of lengths up to 200 feet with greatly improved control of system performance. Instruments in the drill string will provide hole pitch and azimuth data to the driller on the surface. An additional system is being developed to locate the drilling head relative to the roof and floor of the coal seam. A pitch control on the drilling head will enable the driller to use this information to control drilling direction and guide the drill through the coal seam.

0130 Transport And Handling

REFER ALSO TO CITATION(S) 53336, 53346, 53347, 53384, 53390

53411 **(ANL/EES-TM—232) Inland-transport modes for coal and coal-derived energy: an evaluation method for comparing environmental impacts.** Bertram, K.M. (Argonne National Lab., IL (USA)). Jun 1983. Contract W-31-109-ENG-38. 86p. NTIS, PC A05/MF A01. Order Number DE83017991.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This report presents a method for evaluating relative environmental impacts of coal transportation modes (e.g., unit trains, trucks). Impacts of each mode are evaluated (rated) for a number of categories of environmental effects (e.g., air pollution, water pollution). The overall environmental impact of each mode is determined for the coal origin (mine-mouth area), the coal or coal-energy product destination (demand point), and the line-haul route. These origin, destination, and en route impact rankings are then combined into a systemwide ranking. Thus the method accounts for the many combinations of transport modes, routes, and energy products that can satisfy a user's energy demand from a particular coal source. Impact ratings and system rankings are not highly detailed (narrowly defined). Instead, environmental impacts are given low, medium, and high ratings that are developed using environmental effects data compiled in a recent Argonne National Laboratory report entitled Data for Intermodal Comparison of Environmental Impacts of Inland Transportation Alternatives for Coal Energy (ANL/EES-TM-206). The ratings and rankings developed for this report are generic. Using the method presented, policy makers can apply these generic data and the analytical framework given to particular cases by adding their own site specific data and making some informed judgements. Separate tables of generic ratings and rankings are developed for transportation systems serving coal power plants, coal liquefaction plants, and coal gasification plants. The final chapter presents an hypothetical example of a site-specific application and adjustment of generic evaluations. 44 references, 2 figures, 14 tables.

53412 **(BNL—33539) Physico-chemical fracturing and cleaning of coal.** Sapienza, R.S.; Slegeir, W.A.; Butcher, T.; Healy, F. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 14p. (CONF-831008—2). NTIS, PC A02/MF A01. Order Number DE83017583.

From 1. European conference on coal liquid mixtures; Cheltenham, UK (5 Oct 1983).

Mineral-matter content and the costs of grinding are major impediments to the use of coal-water slurries in existing fluid-fuel combustors. A process for the simultaneous cleaning and fracturing of a variety of coals is being explored at Brookhaven National Laboratory. This process entails exposing coal to a carbon dioxide-water solvent system under pressure. Substantial amounts of mineral matter are leached into the liquid phase, significantly lowering the concentrations of alkaline and alkaline earth metals; some of the silica- and alumina-containing minerals in the coal are also removed. The treated coal is more easily crushed than untreated coal and grindability data is reported. 15 references, 2 figures, 4 tables.

53413 **(DOE/EIA—0401(Exec.)) Coal supply and transportation model. Executive summary.** (USDOE Energy Information Administration, Washington, DC. Office of Coal, Nuclear, Electric and Alternate Fuels). Aug 1983. 29p. NTIS, PC A03/MF A01 - GPO. Order Number DE83018256.

Portions are illegible in microfiche products.

The report describes the coal and transportation industries represented by the model and an overview of its analytical capabilities. The Technical Appendix briefly describes the main technical characteristics of the model. The CSTM was developed during calendar year 1982 and is an integral part of the Intermediate Future Forecasting System (IFFS) in addition to being a stand-alone model. It provides forecasts of coal transportation patterns that are essential to rigorous analysis of the coal market over the intermediate term. The stand-alone version has been used to assist the Interstate Commerce Commission (ICC) in support of Ex Parte No. 347 (Sub No. 1) Coal Rate Guidelines-National. Readers with backgrounds in economics, operations research, or mathematical programming will find more technical documentation in the volume, Coal Supply and Transportation Model: Model Description and Data Documentation. This volume is divided into three parts: an overview of the CSTM for the technical reader; a description of the CSTM structure and the operation of the solution algorithm; and a description of the model input data.

53414 **(DOE/PC/30089—T1) Oxydesulfurization of coal. Final report.** Albal, R.S.; Shah, Y.T. (Pittsburgh Univ., PA (USA). Dept. of Chemical and Petroleum Engineering). Feb 1981. Contract AC22-80PC30089. 121p. NTIS, PC A06/MF A01. Order Number DE83006537.

Portions are illegible in microfiche products.

The PETC (Pittsburgh Energy Technology Centre) process for removal of sulfur from coal by oxydesulfurization is one of the most promising processes to meet the EPA emission standards. In this process, crushed coal is suspended in a suitable aqueous medium, and oxygen or air is passed through the slurry. The dissolved oxygen reacts with the pyrite and the organic sulfur in the coal and undesirably with the organic coal matrix. This work was aimed to study the effects of various parameters like coal particle size, pH of the aqueous medium, oxygen partial pressure, temperature, total pressure, solids loading etc. on the amounts of pyritic and organic sulfur removal, to determine amounts of carbon and heating value loss during oxydesulfurization, and to estimate the mass transfer coefficients. For desulfurization, several aqueous (acidic and basic) media are reported in the published literature. Since the conditions of temperature and pressure and the reaction time depend strongly on the aqueous medium used; the rate of pyrite and organic sulfur removal depends as well on the pH of the medium and it was necessary to systematic evaluate the effect of pH on the oxydesulfurization reaction. The removal of organic sulfur from coal is more difficult compared to the pyritic sulfur. Also, the determination of kinetics of the organic sulfur removal is difficult because of the presence of various organic sulfur functional groups. The knowledge of mass transfer coefficient is of immense importance in determining the rate of solute gas mass transfer as well as in determining the rate controlling step in the overall mechanism. The experimental set up for these measurements is complete and has given some initial data. Three appended reports have been entered individually.

53415 (DOE/PC/30089—T1, pp 46p, Paper 1) **Particle size effects in oxidation of pyrite in air/water chemical coal cleaning.** Joshi, J.B. (Univ. of Pittsburgh, PA); Shah, Y.T.; Ruether, J.A.; Ritz, H.J. Feb 1981. NTIS, PC A06/MF A01. Contract AC02-77ET10473.

In Oxydesulfurization of coal. Final report.

Process development of a means for precombustion removal of sulfur from coal by selective oxidation in an aqueous slurry is

reported. The kinetics of the oxidation of pyritic sulfur and heating value loss for Lower Freeport coal are investigated. Experiments were conducted in a semi-batch manner. The effects of coal/particle size (< 72, 72 to 99, 150 to 208, 208 to 430, 700 to 1410, microns), reaction time (0 to 5400 s), temperature (150 to 200°C) and partial pressure of oxygen (0.28 to 1.36 MPa) were studied. The oxidation of pyritic sulfur follows the shrinking core model where the rate controlling step was found to be the reaction between oxygen and pyrite.

53416 (DOE/PC/30089—T1, pp 29p, Paper 2) **Effect of pH on the removal of pyritic sulfur from coal by oxydesulfurization.** Joshi, J.B. (Univ. of Pittsburgh, PA); Shah, Y.T.; Albal, R.S.; Ritz, H.J.; Richey, W.D. Feb 1981. NTIS, PC A06/MF A01.

In Oxydesulfurization of coal. Final report.

The effect of pH on the removal of pyritic sulfur in air/water chemical coal cleaning was investigated. The pH was varied by adding sulfuric acid or sodium carbonate to coal-water slurry. The effect of nearby neutral pH (≈ 7) was determined in a buffer solution of sodium dihydrogen phosphate and disodium hydrogen phosphate. The effect of the presence of calcium carbonate in the slurry was also studied. The temperature was varied from 130° to 190°C (130° to 150°C for alkaline pH and 130° to 190°C for acidic pH). The oxygen partial pressure and the reaction time were varied from 0.32 to 1.36 MPa and from 0 to 3600 s, respectively. The rate of pyrite oxidation was found to be minimum at the nearby neutral pH conditions. Under otherwise identical conditions, the rate of pyrite oxidation was greater in basic pH than in acidic pH. The enhancement in the rate of pyrite oxidation is explained on the basis of electrochemical reaction. Under acidic and nearby neutral conditions, the overall reaction is shown to be controlled by the surface reaction. Under alkaline conditions, the rate-controlling step is probably the combined effect of the oxygen diffusion through the product ash layer of hematite and the surface chemical reaction.

53417 (DOE/PC/30089—T1, pp 13p, Paper 3) **Kinetics of organic sulfur removal from coal by oxydesulfurization.** Joshi, J.B.; Shah, Y.T. (Univ. of Pittsburgh, PA). Feb 1981. NTIS, PC A06/MF A01.

In Oxydesulfurization of coal. Final report.

Chemical processes for coal desulfurization are currently being developed as alternatives to stack-gas scrubbing. Sulfur exists in coal in two main forms: pyritic and organic. It is known that the removal of organic sulfur from coal is very difficult as compared to the pyritic sulfur. Recently, Attar and Dupuis (1978) have determined the distribution of organic functional groups in coal. The most important sulfur functional groups in coal are: (i) derivatives of thiophenes and alkyl thiophenes, (ii) aryl sulfides, (iii) aliphatic sulfides and thiols, (iv) cyclo sulfides and (v) thiophenoles. Out of these compounds, the thiols and the sulfides can be desulfurized without complete destruction of the coal matrix. For the design of oxydesulfurizton reactor, it is desirable to know the intrinsic kinetics of the reaction. Some process development data have been reported by Warzinski et al. (1979) and Wheelock et al. (1978). The determination of kinetics has been difficult because of the presence of number of organic sulfur compounds. Attar (1979) has reported the distribution of sulfur functional groups in the Lower Freeport coal. In this paper we investigate the overall kinetics of the organic sulfur removal from the Lower Freeport coal. The effect of the pH ofl the reaction medium is also examined.

53418 (NYSERDA—83-14) **Application of a coal-pile drainage model to an industrial/institutional site.** (TRC Environmental Consultants, Inc., East Hartford, CT (USA)). Jul 1983. 134p. New York State Energy Research and Development Authority, Two Rockefeller Plaza, Albany, NY 12223.

This report describes the site selection, field sampling and analysis and mathematical model calibration and verification process used to apply a coal pile drainage model to an industrial/institutional site, e.g., a small storage pile of less than 25 tons. The field program included 10 weeks of monitoring drainage flow, pH, conductivity, precipitation, coal moisture, and pile infiltration rates with the analysis of drainage water for acidity, filterable and nonfilterable residue, sulfate and ten trace metals. The program was performed at Cornell University's steam plant coal pile. Five storms were sampled ranging from 0.62 inches to 1.59 inches of rain. The pH of the runoff was generally in the range of 2.0 to 2.8. In several instances, metals concentrations exceeded New York State Department of Environmental Conservation (NYSDEC) effluent limitations for Class GA waters. The model which has two parts, H20TRC (hydraulic) and TRCCOAL (water quality) was calibrated and verified using the field data. The hydraulic portion was able to predict flows within 12% for large storms. The water quality portion was able to predict within 20% for sulfate and iron loadings but was not as accurate in predicting the acid loading. 21 figures, 13 tables.

53419 **Coal preparation.** Killmeyer, R.P. Jr. (Pittsburgh Energh Technology Center, PA); Hucko, R.E.; Holt, E.C. Jr. pp 83-117 of Handbook of energy technology & economics. Meyers, R.A. (ed.). New York, NY; Wiley-Interscience (1983).

The cost of coal cleaning we have addrssed is that experienced by the preparation plant operator. However, this process cost is only a portion of the total economic equation for coal cleaning, since it does not take cognizance of the benefits accruing to the user of clean coal. As a matter of fact, if coal cleaning is viewed from an overall economic perspective where all the various benefits associated with the burning of an improved quality fuel are considered, preparation produces a net benefit. This should not come as a surprise since coal cleaning, or any other mineral processing operation, is not undertaken by the private sector of our economy without the expectation of a return greater than the cost. Therefore, the willingness on the part of coal consumers to pay a premium for clean coal is based on their expectation of realizing monetary benefits that exceed such premiums. Some of the more widely accepted benefits that have been individually quantified include: increased heat content of clean coal (greater Btu content per unit weight); transportation savings (less weight to ship for same Btu content); pulverizing cost savings (less cleaned coal needs to be pulverized for same Btu content required to meet output); boiler and related equipment maintenance savings (clean coal is less erosive and corrosive); ash disposal cost saving (clean coal leaves less bottom and fly ash); and lower emission control costs (less particulate and SO_2 from clean coal); In addition tothe economic benefits, there are other positive features associated with combining physical desulfurization and FGD to meet emission standards. Such a benefit accruing from the combination of these two technologies is a decrease in the time required for FGD installation.

0140 Combustion

REFER ALSO TO CITATION(S) 53370, 53393, 53856, 53857, 53861, 54070

53420 **(AD-A—128772/1) Sulfur oxides control burner. Final report Oct 79-Sep 81.** Williams, D.E. (Naval Civil Engineering Lab., Port Hueneme, CA (USA)). Jan 1983. 28p. (NCEL-TN—1654). NTIS, PC A03/MF A01.

A new approach to burning coal in industrial-size boilers without being constrained by the sulfur content of the fuel was investigated. Coal combustion with the injection of a lime sulfur sorbent was evaluated using an equilibrium combustion computer program. Subsequent experimental work with a flame tube apparatus demonstrated that lime does react effectively with hydrogen sulfide in a low temperature, fuel-rich flame. Applications for this approach include both existing boilers designated for other fuels and new boilers designed for coal firing.

53421 **(PB—83-224931) Fluidised bed combustion, an overview of the Norwegian program.** Evensen, E. (SINTEF, Trondheim (Norway)). 16 Mar 1983. 57p. (STF—15-A83020). NTIS, PC E04/MF E04.

This report gives a short overview of the Norwegian program within the field of fluidised bed combustion. The fluidised bed research and development work began in Norway at 1970 at the Norwegian Institute of Technology. The development work has been carried out in collaboration with Norwegian industry. The fluidized bed pilot plants located at the Norwegian Institute of Technology and commercial plants delivered by Norwegian industry are described and some results are mentioned.

53422 **Technology of preparation, combustion and commercial application of coal-water slurry fuels; shape selective catalysis and synthesis gas chemistry: routes to chemicals and fuels; general papers: combustion and coke; chemistry of combustion processes (abstracts only); pyrolysis processes and products from heavy feedstocks (abstracts only).** Washington, DC; American Chemical Society (1983). 271p. (CONF-830303—). Director of Publications, American Chemical Society, Fuel Division Preprints, 2994 Cottonwood Ct., Santa Clara, CA 95051 $8.00.

From 185. American Chemical Society national meeting; Seattle, WA, USA (20 Mar 1983).

This volume consists of preprints presented at the meeting of the Division of Fuel Chemistry held at Seattle, Washington, March 20-25, 1983. The papers covered coal-water fuel slurries (preparation, combustion and commercial application), the production of chemical feedstocks from synthesis gas by shape selective catalysts, coal combustion and coking, and abstracts only of the chemistry of combustion processes and the pyrolysis of heavy oil feedstocks. Twenty-two papers have been entered individually into EDB. (LTN)

0150 Marketing And Economics

REFER ALSO TO CITATION(S) 53384

53423 **(PB—83-229666) Metallurgical coal in the 1980's - facts and prospects.** Szpilewicz, A. (United Nations Industrial Development Organization, Vienna (Austria)). 19 Jan 1982. 82p. NTIS, PC E05/MF E01.

This paper is on supply and use of metallurgycal coal in the 1980s. It covers (1) mineral resources; output; demand; trade; prices; costs; and technology. (2) It describes relevant conditions in: USA, Canada, Western Europe, Australia, South Africa R, Japan, India, Korea R, Turkey; some Latin American, African and Arab countries; CMEA countries, China, Korea DPR and Vietnam.

0160 Health And Safety

REFER ALSO TO CITATION(S) 53402, 53403, 53404, 53405, 53406, 53407, 53408, 53409, 55076

53424 **(CONF-8308109—1) Problems of toxicological testing of complex mixtures.** Witschi, H.R.; Munro, N.B. (Oak Ridge National Lab., TN (USA)). 1983. Contract W-7405-ENG-26. 10p. NTIS, PC A02/MF A01. Order Number DE83017274.

From 3. international congress on toxicology; San Diego, CA, USA (28 Aug 1983).

Evaluation of the toxicity of products associated with newer coal conversion technologies is discussed. Questions to be considered in obtaining a satisfactory data base are: what data do we need, why do we need to test; are toxicological endpoints sensitive, reliable and discriminating enough; how homogeneous and complex are test materials; how do we expose animals to complex mixtures; and are there toxicological interactions. The author concludes that we do not have sufficient data presently to the assess risk or safety of new synthetic fuels. (DMC)

53425 **(DOE/METC—83-52) Environment, safety, and health annual report, fiscal year 1982.** Pearson, J.D. (ed.). (USDOE Morgantown Energy Technology Center, WV). Apr 1983. 41p. NTIS, PC A03/MF A01. Order Number DE83015796.

During FY82, Morgantown Energy Technology Center (METC) was DOE's lead center for coal gasification, fluidized-bed combustion, unconventional gas recovery, gas stream cleanup, components, combined cycle component integration, and instrumentation and control technologies. Part of METC's overall research effort is the responsibility for monitoring and managing the environmental, safety, and health concerns of each project it supports. This report describes these efforts during FY82. The Environmental Protection Management Program includes monitoring for compliance to standards for air emissions, water/wastewater, and solids/hazardous wastes. In addition, technical assistance in these areas is provided to both on- and off-site projects. During 1982, significant strides were made in implementation of the Wastewater Management Plan. The plan proposed a facility that will serve the environmental needs of METC for the future. The safety program at METC has been expanded from the original safety office to meet the needs of a growing number of projects and personnel and to provide broad safety analysis as test equipment and controls become more complicated. A Process Safety and Environment Committee and a Field Safety Committee are utilized to work with the safety office in responding to on- and off-site safety needs. In response of an increased emphasis on health hazards, the industrial hygiene program has expanded. A comprehensive program includes workplace health management, periodic inspections, exposure evaluations, chemical inventories, and respiratory protection. There was an increased emphasis on employee on-the-job training and general interest training. 7 figures, 1 table.

53426 **(MESA-IR—1002) Testing procedure for the certification of underground protective cabs and canopies.** Sawyer, S.G.; Brogan, D.K. (Mining Enforcement and Safety Administration, Pittsburgh, PA (USA). Pittsburgh Technical Support Center). 1974. 17p. NTIS, PC A02/MF A01. Order Number DE83902979.

A testing procedure by which underground cabs and canopies can be certified has been developed. This procedure requires the cab or canopy to be tested on a rigid platform, which in most situations can be the mining itself, and subjected to a load distributed within the middle ninth of the structure's plan view area. A displacement dial gage or an equivalent measuring device records the maximum and permanent deflections of the structure's top caused by the loading. The total applied load must be at least as great as whichever is smaller, 18,000 lb or 15 psi times the structure's plan view area. If the measured permanent deflection is less than 10% of the recorded maximum deflection, the cab or canopy can be certified by a State-registered professional engineer. The step-by-step procedure for the present testing method along with five examples of how it could be implemented are given the report. The results of the present test, which is simple to conduct, are usually conservative because factors of safety have been introduced to compensate for a loss of accuracy which must occur to gain simplicity in testing.

53427 **(PB—83-235556) Appalachian coal miner mortality study: a 14-year follow-up.** Amandus, H. (National Inst. for Occupational Safety and Health, Morgantown, WV (USA)). 8 Jun 1982. 60p. NTIS, PC A04/MF A01.

From 1963 to 1965, the U.S. Public Health Service examined 3,726 underground Appalachian bituminous coal miners who were living in 1962. Their vital status was verified on January 1, 1973 (10 years of follow-up) and again on January 1, 1976 (14 years of follow-up). Mortality was studied after 10 years and results were published by Ortmeyer (1974) and Costello (1974, 1975). The results of a study of the mortality after 14 years are the subject of this report. The cause of death was determined from the underlying cause recorded on the death certificate. Death from all causes, ischemic heart disease, non-malignant respiratory disease (NMRD), cancer of the trachea, bronchus, and lung, digestive cancer, and accidents were studied.

53428 **(PNL-SA—11371) Identification of mutagenic constituents in coal combustion fly ash.** Wilson, B.W.; Chess, E.K.; Later, D.W. (Pacific Northwest Lab., Richland, WA (USA)). Aug 1983. Contract AC06-76RL01830. 20p. (CONF-830824—1). NTIS, PC A02/MF A01. Order Number DE83017889.

From 1. international fluidized bed combustion and applied technology symposium; Beijing, China (22 Aug 1983).

Data are presented on the characterization or identification of several higher molecular weight nitro polycyclic aromatic compounds which are major constituents of mutagenically active subfractions in organic extracts of fly ash from conventional pulverized coal combustion (PCC). Compounds found in mutagenically active fractions of PCC fly ash are compared to those found in active fractions of fly ash from an experimental fluidized bed combustion (FBC) unit. Several lines of investigation using both instrumental analysis and selective biological techniques have been used to iden-

tify nitro-PAH and oxygenated PAH present in both the FBC and PCC particulates. This paper deals primarily with the chemical characterization of these materials and the instrumental analytical methods used to achieve the reported identifications; the biological techniques used are discussed briefly for completeness.

53429 **A risk comparison summary.** Coppola, A.; Hall, R.E. (Brookhaven National Lab., Upton, NY). pp 841-850 of Probabilistic risk assessment. Volume III. La Grange Park, IL; American Nuclear Society, Inc. (1982). (CONF-810905—).

From ANS/ENS topical meeting on probabilistic risk assessment; Port Chester, NY, USA (20 Sep 1981).

This paper presents data for the comparison of societal risk from natural and man-made hazards. Only fatalities resulting from the hazards are used in the comparison, with the data and the comparative analysis taken from current literature. In comparing societal risks for most of the hazards, both expected values and frequency vs. consequence curves are presented. For a subset of hazards, notably the power generation technologies (nuclear, coal, oil, and gas), which have not exhibited high consequence events (catastrophes), the comparisons are based on estimated expected values only. Individual risk data are presented in two ways, a probability of death within a year and the amount of life shortening of an average life span.

0170 Legislation And Regulations

REFER ALSO TO CITATION(S) 53401, 53402, 53403, 53405, 53406, 53407, 53408, 53409

02 PETROLEUM

REFER ALSO TO CITATION(S) 53448

0201 Reserves

REFER ALSO TO CITATION(S) 53449, 53451

0202 Geology And Exploration

53430 **(DOE/MC/11251—1442) Development of turbodrill tachometer. Final report.** McDonald, W.J.; Dareing, D.W.; Maurer, W.C. (Maurer Engineering, Inc., Houston, TX (USA)). 1 Apr 1981. Contract AC21-79MC11251. 59p. NTIS, PC A04/MF A01. Order Number DE83016342.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The objective of the study was to develop a tachometer for use with the METC turbodrills. Tachometers are needed to allow efficient operation of the turbodrills. The operating speed of the turbodrills is now unknown, resulting occasionally in excessive operating speeds and rapid bit wear. In some applications, good tachometers could increase the footage drilled per bit run and greatly reduce drilling costs. This project resulted in the successful testing of a prototype turbodrill tachometer. The tachometer utilizes a set of partially blanked turbine blades in the motor section of the turbodrill which produce one pressure pulse each time the turbodrill rotates one revolution. The pressure pulses are transmitted through the drilling mud in the drill pipe to the surface where they are detected and processed. The frequency of the pulse signals is a direct measure of the turbodrill rotary speed. Numerous laboratory tests of the pulse tachometer were conducted at Maurer Engineering's turbodrill facility in Houston, Texas. Motor test stand comparisons of the mud pulse tachometer with direct magnetic and optical tachometers usually demonstrated excellent agreement. The tachometer performed well at depths in excess of 10,000 feet in Los Alamos Scientific Laboratories' EE-2 geothermal well. Water was used as the drilling fluid in these tests. The tachometer allowed continual monitoring and control of the LASL turbodrill speed. This attributed, in large part, to the success of the LASL turbodrills. Over 20 successful turbodrill boreholes were made using the tachometer. Although attenuatin is greater in viscous drilling mud than in water, theory indicates that the pulse tachometer should be effective with viscous muds even at depths of 10,000 to 20,000 feet.

0203 Drilling And Production

REFER ALSO TO CITATION(S) 53444

53431 **(DOE/BC/10308—30) Assessment of gamma-inject logging techniques for the determination of residual oil saturation. Final report.** Pecina, R.J.; Walbridge, E.W.; Vandegrift, G.F.; Herzenberg, C.L.; Seitz, M.G.; Heemstra, R.J. (Argonne National Lab., IL (USA); USDOE Bartlesville Energy Technology Center, OK). Aug 1983. Contract AC19-80BC10308. 80p. NTIS, PC A05/MF A01. Order Number DE84000607.

Work, both theoretical and experimental, was done to assess the feasibility of logging oil by injecting radioactive fluids into depleted reservoirs and measuring the gamma signal returning to the borehole. The theoretical work established the relationship between residual oil and detected gamma signal and estimated the error in the determined value of residual oil. Errors of 5 saturation percent or greater can readily occur from inaccurate measurements or from improper accounting of actual borehole conditions. Sources of error must be controlled to give values of residual oil accurate enough (error less than 5 saturation percent) to properly assess the economic feasibility for additional oil production. The experimental work involved relating measured gamma signals from fluids and rock to various conditions expected during oil logging. Seen to affect the measured gamma signal were (1) the residual-oil levels in rock cores, (2) the rock-wetting fluid (oil-wet vs water-wet core), (3) the surfactant concentration of the radioactive solution, and (4) the type of gamma-emitting radionucide. However, the gamma signals were not very sensitive to residual-oil levels probably because the water in the rock was not completely displaced by the injected radioactive fluid under the laboratory conditions employed. This incomplete displacement results in only half the residual oil being detected under otherwise ideal circumstances. This source of error and others discussed in the theoretical and experimental sections severly restricts the utility of logging residual oil using injected radioactive solutions. 34 references, 21 figures, 8 tables.

53432 **(DOE/BC/10309—16) Development of an improved method for the analysis of pressure-core samples. Final report.** Carlisle, C.T.; Simms, L.A.; Sitz, C.D.; Tong, D.D.; Bohnstedt, C.F. (Geochem Research, Inc., Houston, TX (USA)). Aug 1983. Contract AC19-80BC10309. 48p. NTIS, PC A03/MF A01. Order Number DE84000525.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Pressure coring a reservoir formation yields excellent samples for use in determining reservoir oil saturations. It is particularly applicable to formations which contain high API gravity oil. Such formations generally contain low-boiling hydrocarbons which can be lost during conventional coring and subsequent core analysis. The objective of this study was to develop and devise an analytical program to handle and to analyze pressure-core samples collected at the well-site. All hydrocarbons and water were to be extracted and measured directly as a requirement of the analytical design. The volume of the evolved hydrocarbon and nonhydrocarbon gases of the pressure-core sample is measured after the frozen core sample is allowed to thaw in a sealed chamber. The composition and relative quantity of these gases are then determined by standard gas chromatographic procedures. The gasoline and kerosene range of hydrocarbons are then thermally driven from the core and volumetrically measured. This is followed by determining water content of the core samples by a modified Dean-Starks procedure. Finally, the C_{14}^{+} crude oil is further solvent extracted from the core and directly measured by a careful concentration of the solvent extract in a Kuderna-Danish concentrator. A system is also discussed which can be used to measure porosity and permeability at overburden stress. Pressure-core samples from the Conoco MCA Unit No. 358 Well, Hobbs, New Mexico and the Texas Pacific BRU No. 310 Well were analyzed using techniques developed in this study. The fluid saturations, porosity and permeability data for these samples are reported. Hydrocarbon fractions were analyzed by GC and GC/MS to determine the hydrocarbon range in each analytical step. 10 references, 19 figures, 10 tables.

53433 **(DOE/ET/12047—T10) Improved secondary oil recovery by controlled waterflooding-pilot demonstration: Ranger Zone, Fault Block VII, Wilmington Field. Phase IV. Quarterly report, April-June 1983.** (Long Beach, City of, CA (USA); THUMS Long Beach Co., CA (USA)). 12 Jul 1983. Contract AC03-76ET12047. 19p. NTIS, PC A02/MF A01. Order Number DE83015830.

Portions are illegible in microfiche products.

The project is an improved waterflood demonstration of alkaline water-flooding in a typical well flood pattern of the Ranger Zone of the Long Beach Unit portion of the Wilmington Field. A mixture of 0.4% sodium hydroxide and sodium silicate in fresh water containing 0.75 to 1.0% salt is being injected to improve oil recovery. The demonstration pattern in which D.O.E. participated involves the input of approximately 30,000 to 34,000 B/D water in 8 injection wells which surround 11 active producers in an area of 93 acres. Reservoir engineering studies have shown that the total area being affected by the injection in these 8 wells is much larger, being approximately 200 acres including areas situated both north and south. If the alkaline injection is successful, improved flood efficiency should occur as demonstrated by reduced water-oil ratios and increased oil recovery. Chemical injection continued in the quarter. A simple long term solution to the floc formed on mixing the dilute alkaline solution with the concentrated salt brine was not found. Alternating one week slug injection of soft water with alkali and then soft water with salt continued throughout the quarter. A four-hour soft water spacer with no chemicals was placed between the slugs. Injection and oil, water production data are presented. 7 figures, 1 table.

53434 **(SAND—83-0518) Corrosion response of downhole steam generator assembly and instrumentation and supply line tubings at Long Beach field test.** Weirick, L.J. (Sandia National Labs., Albuquerque, NM (USA)). Jul 1983. Contract AC04-76DP00789. 58p. NTIS, PC A04/MF A01. Order Number DE83017995.

Three families of metals were used to make the non-combustor components for Sandia's downhole steam generator assembly and supply and instrumentation lines. These three families were: first, plain carbon steel (API Grade J 55); second, austenitic stainless steels (316 and 310); and third, a nickel-base superalloy (Inconel 600). The metals in all three of these families were found to be deficient in their corrosion response. J 55 exhibited minimal to severe general corrosion (rusting). The austenitic stainless steels pitted and cracked. Inconel 600 showed both severe pitting and some intergranular attack. For the most part, these materials were found to be unsuitable for extended life in a downhole steam generator. It is recommended that Inconel 625 be used in future systems where a moderate strength material is specified and Inconel 718 be considered where a high strength material is necessary. 11 references, 45 figures, 5 tables.

53435 **Downhole steam generator using low pressure fuel and air supply.** Fox, R.L. (to Dept. of Energy). US Patent 4,390,062. 28 Jun 1983. Filed date 7 Jan 1981. vp.

PAT-APPL-222863.

An apparatus is claimed for generation of steam in a borehole for penetration into an earth formation wherein a spiral, tubular heat exchanger is used in the combustion chamber to isolate the combustion process from the water being superheated for conversion into steam. The isolation allows combustion of a relatively low pressure oxidant and fuel mixture for generating high enthalpy steam. The fuel is preheated by feedback of combustion gases from the top of the combustion chamber through a fuel preheater chamber. The hot exhaust gases of combustion at the bottom of the combustion chamber, after flowing over the heat exchanger enter an exhaust passage and pipe. The exhaust pipe is mounted inside the water supply line heating the water flowing into the heat exchanger. After being superheated in the heat exchanger, the water is ejected through an expansion nozzle and converts into steam prior to penetration into the earth formation. Pressure responsive doors are provided at a steam outlet downstream of the nozzle and close when the steam pressure is lost due to flameout.

53436 **Wellbore inertial directional surveying system.** Andreas, R.D.; Heck, G.M.; Kohler, S.M.; Watts, A.C. US Patent Application 6-415,941. 8 Sep 1982. 68p. Contract AC04-76DP00789.

Portions are illegible in microfiche products.

A wellbore inertial directional surveying system for providing a complete directional survey of an oil or gas well borehole to determine the displacement in all three directions of the borehole path relative to the well head at the surface. The information generated by the present invention is especially useful when numerous wells are drilled to different geographical targets from a single offshore platform. Accurate knowledge of the path of the borehole allows proper well spacing and provides assurance that target formations are reached. The tool is lowered down into a borehole on an electrical cable. A computer positioned on the surface communicates with the tool via the cable. The tool contains a sensor block which is supported on a single gimbal, the rotation axis of which is aligned with the cylinder axis of the tool and, correspondingly, the borehole. The gyroscope measurement of the sensor block rotation is used in a null-seeking servo loop which essentially prevents rotation of the sensor block about the gimbal axis. Angular rates of the sensor block about axes which are perpendicular to te gimbal axis are measured by gyroscopes in a manner similar to a strapped-down arrangement. Three accelerometers provide acceleration information as the tool is lowered within the borehole. The uphole computer derives position information based upon acceleration information and angular rate information. Kalman estimation techniques are used to compensate for system errors. 25 figures.

0204 Processing

REFER ALSO TO CITATION(S) 54880

0206 Health And Safety

REFER ALSO TO CITATION(S) 53429

0208 Waste Management

REFER ALSO TO CITATION(S) 53389

0209 Environmental Aspects

REFER ALSO TO CITATION(S) 53394, 54880, 54885, 54943, 54944, 54957

53437 **(AD-A—126350/8) Surface drifter study - Beaufort Sea, Alaska. Final report.** Lissauer, I.M.; Matthews, J.B. (Coast Guard Research and Development Center, Groton, CT (USA)). Jul 1982. 66p. (CGR/DC—14/82). NTIS, PC A04/MF A01.

Surface drifters were released in the Beaufort Sea near Prudhoe Bay, Alaska for two years (1979-82). The releases were made under the shorefast ice just prior to summer breakup of the ice and in leads in the pack ice. The drifter recoveries indicate that the winds play a significant role in the surface circulation during the open water season. A significant number of drifters beached 'onshore' of their release sites. 'Preferred' beaching areas are identified from the drifter recoveries. All these results indicate the strong possibility that oil released offshore in the Beaufort Sea will impact the North Alaska Coast.

53438 **(AD-A—129402/4) Development of a flaring burner disposal system. Final report.** Beach, R.L.; Lewis, W.T. (Seaward International, Inc., Falls Church, VA (USA)). May 1983. 95p. NTIS, PC A05/MF A01.

This report describes the work performed to develop a flaring burner system for spilled and recovered oils. The system is capable of flaring 180 gpm of light oil or 90 gpm of oil with a viscosity of up to 1,600 centistokes. Smokeless burning can be achieved in certain cases. The system is designed to be portable, such that the entire system can be broken down into modules and transported in a C-130 aircraft, and each module is light enough to be carried to a

remote spill site by a Coast Guard helicopter. The system is self-erecting and is capable of operating safely in hazardous environments and in arctic conditions. The report describes the initial burner selection and the tests that were conducted to determine the burning parameters. The performance test program conducted on the completed prototype system is also described. These tests were successfully completed, with the conclusion that the prototype could be used for operational flaring at this time.

53439 **(CONF-830847—1) CEREAS: an interactive computer-mapping system for environmental assessments.** Levenson, J.B.; Snider, M.A. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 16p. NTIS, PC A02/MF A01. Order Number DE83017927.

From Energy resource management '83; San Francisco, CA, USA (23 Aug 1983).

CEREAS (Categorical Exclusion Review/Environmental Assessment System) provides the environmental scientist with the tools needed to quickly process an application for permit to drill (APD). It provides an interactive referencing system for producing maps of potential constraint areas surrounding oil and gas activity sites. The design of the system makes it highly flexible. CEREAS was specifically developed to support the CER procedure in processing APDs for oil and gas in the western overthrust belt. It should be emphasized, however, that the system is not limited by geographic boundaries, CER criteria, or oil and gas activities. Of the three system components, only the mapping program remains constant. The command processor and data bases are necessarily project-specific, contributing to the overall system flexibility. Any geographic data potentially defined by longitude/latitude coordinates can be designated as a data base. CEREAS, as described here, is basically a graphic data retrieval system.

53440 **(NP—3910818) Diapir Field lease offering, June 1984.** (Minerals Management Service, Anchorage, AK (USA). Alaska Outer Continental Shelf Region). Sep 1983. 598p. NTIS, PC A25/MF A01. Order Number DE83910818.

Portions are illegible in microfiche products.

The leasing proposal consists of a total of 7,297,053 hectares (18 million acres) on the outer continental shelf (OCS). The 3355 blocks are located in the Beaufort and Chukchi Seas 5 to 257 kilometers offshore in waters that are from 10 to greater than 200 meters deep. This lease offering is tentatively scheduled to be held in June 1984. Adverse effects on the environment may result from accidental oilspills. Socioeconomic effects from onshore development could have state, regional, and local implications. Several alternatives and mitigating measures which would reduce the type, occurrence, and extent of adverse impacts associated with this proposal are offered for consideration. Other measures, which are beyond the capability of this agency to apply, have also been identified. In spite of these mitigating measures, some impacts are considered unavoidable. For instance, oilspills may occur and there would be some disturbance to wildlife values, and some onshore development would occur in undeveloped areas. This EIS discusses the probable impacts of oilspills on each significant ecological resource. These probable impacts are based on an oilspill risk model. Alternatives to the proposed action are: no sale; delay the sale; modify the proposed lease offering by deleting 600 blocks in the vicinity of Point Barrow; modify the proposed lease offering by deleting 351 blocks in the vicinity of Kaktovik east to the Canadian boundary line.

53441 **(PB—83-228650) Potential damage of oil wastes in coastal estuary sediments.** Lytle, J.S.; Lytle, T.F. (Mississippi-Alabama Sea Grant Consortium, Ocean Springs, MS (USA)). Jun 1983. 14p. (MASGP—82-024). NTIS, PC A02/MF A01.

Bayou Casotte, Mississippi, an estuarine waterway near the eastern end of Mississippi Sound, has been altered to accommodate an extensive industrial complex including a large oil refinery. Several small oil spill accidents recently occurred in the bayou; the most serious, on June 13, 1981, involved 600 barrels of asphaltic crude. The ecological effects of continued exposure to low level oily wastes were estimated by examining pollution levels in sediments. Toxicological examination of sheepshead minnows, mysid shrimp and amphipods reveals significant mortalities to mysids from bioassay exposures to surficial sediments. Settling rate determinations, leachability, community structure vulnerability, and sediment disturbance probability are factors assimilated into an 'environmental stress index' that indicates this to be a potentially harmful site to bottom feeders and, if sediments are disturbed, to free swimming organisms in sensitive life stages.

53442 **(PB—83-234088) Oil spill incidence simulation model: description and user's manual.** Kondratowicz, L.J.; Psaraftis, H.N. (Massachusetts Inst. of Tech., Cambridge (USA). Sea Grant Coll. Program). Oct 1980. 73p. NTIS, PC A04/MF A01.

The purpose of this report is to describe work conducted to date on a component of the overall modeling structure of the research project 'Oil Spill Clean-up Economic and Regulatory Models.' This component is the so-called Oil Spill Incidence Simulation Model. It is intended to simulate random spill incidents of different types of oil, occurring at various locations from different sources, during a period of specified duration.

0220 Transport, Pipelines, And Handling

REFER ALSO TO CITATION(S) 53745

0230 Properties

REFER ALSO TO CITATION(S) 53432

0240 Storage

REFER ALSO TO CITATION(S) 54091

0250 Combustion

REFER ALSO TO CITATION(S) 53739

53443 **(AD-A—128255/7) Study of factors affecting soot formation in a swirl-stabilized combustor. Final report 22 Jan 80-30 Sep 82.** Rice, R.W.; Berlinrut, D.D.; Jenkins, J.C. (Air Force Engineering and Services Center, Tyndall AFB, FL (USA)). 1 Apr 1983. 34p. NTIS, PC A03/MF A01.

The effects of a variety of combustion and sampling variables on soot concentration and particle size distribution were studied using a swirl-stabilized laboratory combustor and an electrical aerosol analyzer (EAA). Tests were conducted over a range of reference velocities (2.5 to 10m/s) and equivalence ratios (0.05 to 0.3) for five gaseous fuels: propane, n-butane, ethylene, propylene, and 1-butene. Soot concentration and size were found to decrease with increases in either gas reference velocity or equivalence ratio. Alkenes produced more and larger soot particles tha alkanes of corresponding carbon number. Sooting tendency increased with increased carbon chain length. Probe placement and sample line length affected soot concentration measurements. Smoke number readings were obtained for comparison with EAA data. Recommendations were made for further work on the topics lightly surveyed in this study and for extensions which could possibly answer important questions raised here concerning soot growth/oxidation phenomena.

03 NATURAL GAS

0303 Drilling, Production, And Processing

REFER ALSO TO CITATION(S) 53436

53444 **(DOE/EIA—0347(82-83)) Indexes and estimates of domestic well drilling costs, 1982 and 1983.** (USDOE Energy Information Administration, Washington, DC. Office of Oil and Gas). Sep 1983. 88p. NTIS, PC A05/MF A01 - GPO. Order Number DE83018223.

Estimated well drilling and completion costs and indexes for 13 onshore geographical areas of the United States are presented for oil wells, gas wells, and dry holes. Service wells are not included. The EIA-developed procedure for making these estimates utilizes the historical drilling costs data published annually by the Joint Association Survey (JAS) in conjunction with specified cost variables that also could be determined by EIA on the same historic basis. The procedure was used to project 1982 and 1983 costs for wells drilled to selected-representative depths. Individual cost and index tables are presented by type of well, geographical area and depth, along with a plot of the drilling costs for the most commonly drilled depth during 1981. There are three appendixes. Appendix A presents historical plots of the values of the specified cost variables. Appendix B shows the difference between the reported JAS data and estimated 1981 drilling costs. Appendix C lists the API well completion statistics and tabulations of revised hole production factors.

0305 Health And Safety

REFER ALSO TO CITATION(S) 53429

0306 Marketing And Economics

REFER ALSO TO CITATION(S) 53446

53445 **(DOE/EIA—0130(83/08)) Natural gas monthly.** (USDOE Energy Information Administration, Washington, DC. Office of Oil and Gas). Aug 1983. 155p. NTIS, PC A08/MF A01 - GPO. Order Number DE83017566.

Portions are illegible in microfiche products.

The Natural Gas Monthly (NGM) highlights activities, events, and analyses of interest to public and private sector organizations associated with the natural gas industry. The NGM replaces three EIA reports previously published annually: Underground Natural Gas Storage in the United States; US Imports and Exports of Natural Gas; Main Line Sales of Natural Gas to Industrial Users. Some of the highlights are: marketed production of natural gas during June 1983 was estimated at 1307 billion cubic feet (Bcf), 178 Bcf (12.0 percent) below the June 1982 level; consumption of natural gas during June 1983 was an estimated 1060 Bcf, a decrease of 55 Bcf (4.9 percent) compared to June 1982 consumption; natural gas consumption in May 1983, compared to the previous May, was up 14.0 percent in the residential sector, up 7.9 percent in the commercial sector, and up 14.2 percent in the industrial sector; the volume of working gas in underground storage reservoirs at the end of June 1983 was 3.1 percent above the June 30, 1982 level; the average wellhead price of natural gas in April 1983 was $2.63 per thousand cubic feet (Mcf) compared to $2.35 per Mcf for April 1982; in June 1983, the US city average residential price for 100 therms of natural gas was $64.70 ($6.63 per Mcf), the comparable price in June 1982 was $54.80 ($5.62 per Mcf); the average wellhead (first sale) price for natural gas purchases projected for July 1983 by selected interstate pipeline companies was $2.72 per Mcf, in July 1982 the average price was $2.45 per Mcf.

0307 Waste Management

REFER ALSO TO CITATION(S) 54886

0308 Environmental Effects

REFER ALSO TO CITATION(S) 53394, 53439, 53440

0320 Transport, Pipelines, And Handling

REFER ALSO TO CITATION(S) 53745

53446 **(TVA/OP/EDT—82/54) Energy recovery from natural-gas pressure-regulator stations.** Hall, J.A. (Tennessee Valley Authority, Chattanooga (USA). Office of Power). 23 Jun 1983. 42p. NTIS, PC A03/MF A01. Order Number DE83910827.

Portions are illegible in microfiche products.

This paper examines the concept of generating electricity using the energy normally wasted by throttling high-pressure gas at natural gas pressure-regulator or depressurization stations. It was found that this concept is technically feasible and that by using this concept: a maximum of 40 MW of electricity could be generated in the TVA region; electricity could be generated at an overall cycle efficiency of 70% or greater; and electricity could be generated at a total cost of less than 4 cents/kWh (1981 dollars). 2 figures, 6 tables.

0340 Combustion

REFER ALSO TO CITATION(S) 53739

53447 **(PB—83-188656) Effect of fuel gas composition on appliance performance. Topical report Jul 78-Dec 82.** Griffiths, J.C.; Connelly, S.M.; DeRemer, R.B. (Science Applications, Inc., Chatsworth, CA (USA). Combustion Science and Advanced Technology Dept.). Dec 1982. 197p. NTIS, PC A09/MF A01.

Burner performance with various fuel gases has been related to gas composition in terms of flame characteristics, such as lifting flames, yellow tipping and flashback for simulated natural gases and peak-shaving gases. Variations in gas compositions of these gases do not appear to notably affect efficiences of residential forced-air furnaces, hot water boilers, water heaters and ranges, or temperatures of ignition system components or appliance burners. Data have been obtained on emissions of CO_2, CO, NO and NO_2 in combustion products of simulated natural and peak-shaving gases.

0350 Storage

REFER ALSO TO CITATION(S) 53445

04 OIL SHALES AND TAR SANDS

53448 **(CONF-8206214—) National tar sands (heavy oil) symposium.** (Kentucky Geological Survey, Lexington (USA)). 1982. 268p. NTIS, PC A12/MF A01. Order Number DE83016809.

From National tar sands (heavy oil) symposium; Lexington, KY, USA (10 Jun 1982).

Portions are illegible in microfiche products.

Individual abstracts were prepared for each of the 12 papers presented at the symposium.

0401 Reserves And Exploration

REFER ALSO TO CITATION(S) 53457, 53458

53449 (CONF-8206214—, pp 1-44) **Toward an estimate of world heavy crude oil and tar sands resources.** Meyer, R.F.; Fulton, P.A. (Geological Survey, Reston, VA). 1982. NTIS, PC A12/MF A01.

From National tar sands (heavy oil) symposium; Lexington, KY, USA (10 Jun 1982).

Data were gathered on heavy oil and bitumen occurrences amenable to in-situ recovery or by mining and a first approximation made as to the amount recoverable as a reserve. Tables are given of US enhanced recovery projects in heavy oil fields, enhanced recovery projects in heavy oil fields outside the US, ultimate recovery from US fields, ehavy crude oil and bitumen in US oil fields by basin, bitumen in US oil fields by geologic basin, US bitumen deposits, heavy crude oil summary by country, bitumen summary by country, total heavy oil and bitumen by country, and production, reserves, and ultimate recovery for Texas by basin. Topics covered include oil mining, heavy oil offshore, geologic basins, undiscovered resources, country commentary, and world summary. 70 references.

53450 (CONF-8206214—, pp 45-66) **Tar-sand resources of western Kentucky.** Noger, M.C. (Kentucky Geological Survey, Lexington). 1982. NTIS, PC A12/MF A01.

From National tar sands (heavy oil) symposium; Lexington, KY, USA (10 Jun 1982).

Numerous surface and subsurfae occurrences of tar sand have been reported in Early Pennsylvanian and Late Mississippian sandstones in western Kentucky. Available geologic data suggest that proximity of some occurrences to faults may indicate structural control. Other deposits appear to be related to sandstone-filled paleovalleys, stratigraphic traps, or local porous zones. Much detailed subsurface information is needed to determine the geological factors responsible for localization of western Kentucky tar-sand deposits. To date, exploration and development activities in western Kentucky suggest that significant oil resources are present in Pennsylvanian sandstones in Edmonson County and the Big Clifty Sandstone (Mississippian) in Logan County. Inventory of reported subsurface occurrences of heavy oil indicates that considerable oil resources may be present in the Big Clifty Sandstone in parts of Logan, Butler, Warren, and Edmonson Counties; in Pennsylvanian sandstones in northeastern Grayson and central Breckinridge Counties; in the Hardensburg Sandstone (Mississippian) in central Edmonson, northern Warren, northeastern Grayson, and central Breckinridge Counties; and in the Tar Springs Sandstone in Breckinridge County.

53451 (CONF-8206214—, pp 67-87) **Tars and heavy crude in Texas.** Fisher, W.L. (Univ. of Texas, Austin). 1982. NTIS, PC A12/MF A01.

From National tar sands (heavy oil) symposium; Lexington, KY, USA (10 Jun 1982).

Heavy crude oil and tar deposits constitute a significant resource in Texas. Some 120 million barrels of heavy crude have been produced to date, and several thermal recovery techniques have been employed. Tar production to date, save for pilot and experimental efforts, has been for non-crude, chiefly paving, uses. Some 10 million barrels equivalent of tar have been produced to date. Estimated in-place resources of tar are some 2 to 5 billion barrels, although the volume may be considerably higher. The chief known concentration is in the South Texas San Miguel deposit. Heavy crude (less than 20° API) in-place resources are estimated at about 10 billion barrels.

53452 (CONF-8206214—, pp 88-93) **Tar sand resources of Utah.** Ritzma, H.R. 1982. NTIS, PC A12/MF A01.

From National tar sands (heavy oil) symposium; Lexington, KY, USA (10 Jun 1982).

Utah's 53 deposits of oil-impregnated rock are mostly located within and around the Unita Basin of northeast Utah and in the central southeast part of the state. Twenty-five deposits have been found in the Unita Basin and twenty-two in the central southeast region. Six minor deposits are widely scattered in the northwest, southwest and far southeast parts of the state.

53453 (CONF-8206214—, pp 94-109) **Characteristics of tar sands of Alabama.** Wilson, G.V. (Geological Survey of Alabama, University). 1982. NTIS, PC A12/MF A01.

From National tar sands (heavy oil) symposium; Lexington, KY, USA (10 Jun 1982).

Outcrop occurrences and physical characteristics of the tar sand deposits of north Alabama are described: geochemical characteristics of the petroleum are discussed.

53454 (CONF-8206214—, pp 110-128) **Tar sand resource appraisal in south-central Oklahoma.** Harrison, W.E. (Univ. of Oklahoma, Norman). 1982. NTIS, PC A12/MF A01.

From National tar sands (heavy oil) symposium; Lexington, KY, USA (10 Jun 1982).

Two counties (Craig and Ottawa) are presently being studied for tar sand potential. The geology of south-central Oklahoma is briefly described. Detailed information is given for three quarry and outcrop sites. Rough estimates of in-place bitumen in the study area vary from about 200 to 800 million barrels.

0402 Site Geology And Hydrology

REFER ALSO TO CITATION(S) 53453

0404 Oil Production, Recovery, And Refining

REFER ALSO TO CITATION(S) 53462

53455 (CONF-8206214—, pp 129-161) **US tar sand oil recovery projects.** Marchant, L.C.; Koch, C.A. 1982. NTIS, PC A12/MF A01.

From National tar sands (heavy oil) symposium; Lexington, KY, USA (10 Jun 1982).

Continued research and the field testing in 63 reported oil recovery projects is providing the base of knowledge and experience for the economic exploitation of this energy resource. Cost data from several of the field projects indicate costs per cubic meter of produced oil in the $100 to $125 range. The 63 projects are summarized in tabular form.

53456 (CONF-8206214—, pp 162-172) **Tarco semi-commercial solvent extraction of tar sands.** Hastings, L. 1982. NTIS, PC A12/MF A01.

From National tar sands (heavy oil) symposium; Lexington, KY, USA (10 Jun 1982).

Tarco is a semi-commercial pilot plant built in southwest Kentucky to demonstrate the extraction of bitumen from the sands. The basic flow pattern involves: mining, crushing, feed to the plant, extraction, desolventizing of the sand, and distillation of the solvent from the oil. It is available for a fee for testing of different feeds.

53457 (CONF-8206214—, pp 173-184) **In situ production of heavy oil from Kentucky tar sands.** Ward, G.D. (Westken Petroleum Corp., Bowling Green, KY). 1982. NTIS, PC A12/MF A01.

From National tar sands (heavy oil) symposium; Lexington, KY, USA (10 Jun 1982).

A one acre inverted seven spot pilot pattern was constructed in the summer and fall of 1981. Injection of steam was commerced in November of 1981, and heavy oil production commenced in February of 1982. Assuming favorable recovery and economic data plans are to proceed with a 10,000 B/D commercial facility in Edmonson County.

53458 (CONF-8206214—, pp 185-204) **Heavy oil and oil sands research and development in Alberta, Canada.** Steele, C.T. (Alberta Oil Sands Tech. and Research Authority, Edmonton). 1982. NTIS, PC A12/MF A01.

From National tar sands (heavy oil) symposium; Lexington, KY, USA (10 Jun 1982).

It is being recognized that the total quantity of hydrocarbons in bitumen deposits worldwide is much greater than in conventional crude oil fields. Getting the bitumen out is the major challenge, and much effort is being directed to solving this problem. The expenditure of hundreds of millions of dollars by the Government of Alberta and industry is an indication of the magnitude of the challenge. Alberta has become recognized as a world center for technology development and information on most all phases of bitumen recovery.

53459 (CONF-8206214—, pp 205-238) **Conoco's tar sands development in south Texas.** Britton, M.W. 1982. NTIS, PC A12/MF A01.

From National tar sands (heavy oil) symposium; Lexington, KY, USA (10 Jun 1982).

A number of the key past, present, and future activities associated with the exploration, production, and refining aspects of the development are outlined and discussed. The San Miguel deposit geology, reservoir conditions, tar properties, past production history, the Fracture Assisted Steamflood Technology (FAST) process, the Street Ranch pilot test, and the Saner Ranch pilot are described. 48 references.

53460 **(DOE/ET/11041—T1) Refining to high yields of jet fuel from shale oil. Final report.** (Suntech, Inc., Marcus Hook, PA (USA). Applied Research Dept.). Jul 1983. Contract AC01-78ET11041. 43p. NTIS, PC A03/MF A01. Order Number DE83016248.

As produced, raw retorted shale oil is unsuited for use as a refinery feedstock or as a finished fuel product. Severe catalytic hydrotreating is the approach usually taken to reduce nitrogenous and other undesirable hetero-atomic species to acceptable levels. This exploratory study investigated the use of an alternative upgrading scheme which combined partial hydrotreating of the raw shale oil with treatment of the hydrotreated products by anhydrous hydrogen chloride (HCl) to separate a non-miscible amine hydrochloride adduct. The effect of shale oil hydrotreating severity level on the yields of HCl adduct and raffinate was determined. Reaction conditions required to thermally decompose the HCl adduct were defined, and the hydrogen manufacturing potential of the amine concentrate so produced was estimated for a partial oxidation process. This hydrogen potential was compared with the hydrogen consumption during hydrotreating to estimate the approximate hydrotreating severity level required for balanced operation with respect to hydrogen utilization. Several aspects of raffinate clean-up were studied, including the further reduction of nitrogen content beyond that achieved by the HCl extraction, as well as reductions in raffinate chloride content.

0405 Properties And Composition

REFER ALSO TO CITATION(S) 53380

0408 Marketing And Economics

53461 (CONF-8206214—, pp 239-265) **Propsects for commercial tar sand development: an appraisal of the institutional, technical, and economic factors that affect decision-making.** Dike, D.H. (Groundwater Technology, Inc., Chadds Ford, PA); Resnick, B.S.; Metz, R.D. 1982. NTIS, PC A12/MF A01.

From National tar sands (heavy oil) symposium; Lexington, KY, USA (10 Jun 1982).

Estimates of domestic tar sand resources approach 37 billion barrels of oil in place. Although over 500 tar sand occurrences have been reported in 22 states, the resource is concentrated in 9 states: Alabama, California, Kansas, Kentucky, Oklahoma, Missouri, New Mexico, Texas, and Utah. Utah alone accounts for 23 to 29 billion barrels of estimated oil in place. Mineability factors are discussed along with economic factors and institutional factors.

0409 Waste Research And Management

REFER ALSO TO CITATION(S) 53389

53462 **(DOE/LC/10678—T1) Physical-chemical treatment of tar-sand processing wastewater.** King, P.H. (Arizona Univ., Tucson (USA)). Jul 1982. Contract AS20-81LC10678. 125p. NTIS, PC A06/MF A01. Order Number DE83017634.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This final report for Phase I summarizes work done to determine the ability of several coagulants to contribute significantly in the treatment of selected tar sand wastewaters. The coagulation process must be considered as one possible step in a treatment scheme to reduce pollutants in these wastewaters and lead to a water quality acceptable for reuse or disposal. Two wastewaters were provided by the Laramie Energy Technology Center (LETC). The primary emphasis in this study was focused on a representative steam flooding wastewater designated in the report as TARSAND 1S. The coagulation study in which treatment of this wastewater was the prime goal is described in full detail in the thesis entitled Chemical Coagulation of Steam Flooding Tar Sand Wastewaters. This thesis, written by Mr. Omar Akad, is included as Appendix A in this report. A representative combustion wastewater, designated as TARSAND 2C, was also provided by LETC. This wastewater was characteristically low in suspended solids and after initial screening experiments were conducted, it was concluded that coagulation was relatively ineffective in the treatment of TARSAND 2C. Hence, efforts were concentrated on the parametric evaluation of coagulation of TARSAND 1S. The objectives for the research conducted under Phase I were: (1) to compare the effectiveness of lime, alum, ferric chloride and representative synthetic organic polymers in reducing suspended solids and total organic carbon (TOC) from TARSAND 1S wastewater; (2) to determine the effects of pH, coagulant aids, and mixing conditions on the coagulation process; (3) to determine the relative volume of sludge produced from each selected coagulation process.

53463 **Purifying contaminated water.** Daughton, C.G. (to Dept. of Energy). US Patent 4,387,025. 7 Jun 1983. Filed date 27 Oct 1981. vp.

PAT-APPL-315378.

Process for removing biorefractory compounds from contaminated water (E.G., oil shale retort waste-water) by contacting same with fragmented raw oil shale. Biorefractory removal is enhanced by preactivating the oil shale with at least one member of the group of carboxylic, acids, alcohols, aldehydes, ketones, ethers, amines, amides, sulfoxides, mixed ether-esters and nitriles. Further purification is obtained by stripping, followed by biodegradation and removal of the cells.

0410 Enviromental Aspects

REFER ALSO TO CITATION(S) 53394

05 NUCLEAR FUELS

REFER ALSO TO CITATION(S) 54205

0501 Reserves

53464 **(GJBX—37(83)-Vol.1) Bibliography of Utah radioactive occurrences. Volume I.** Doelling, H.H. (comp.). (Bendix Field Engineering Corp., Grand Junction, CO (USA); Utah Geological and Mineral Survey, Salt Lake City (USA)). Jul 1983. Contract AC13-76GJ01664. 321p. NTIS, PC E12/MF $6.50. Order Number DE83017917.

Includes 12 sheets of 24x reduction microfiche.

The references in this bibliography were assembled by reviewing published bibliographies of Utah geology, unpublished reports of the US Geological Survey and the Department of Energy, and various university theses. Each of the listings is cross-referenced by location and subject matter. This report is published in two volumes.

53465 **(GJBX—37(83)-Vol.2) Bibliography of Utah radioactive occurrences. Volume II.** Doelling, H.H. (comp.). (Bendix Field Engineering Corp., Grand Junction, CO (USA); Utah Geological and Mineral Survey, Salt Lake City (USA)). Jul 1983. Contract AC13-76GJ01664. 310p. NTIS, PC A14/MF A01. Order Number DE83017526.

The references in this bibliography were assembled by reviewing published bibliographies of Utah geology, unpublished reports of the US Geological Survey and the Department of Energy, and various university theses. Each of the listings is cross-referenced by location and subject matter. This report is published in two volumes.

53466 **(USGS-OFR—78-926) Relation of mercury, uranium, and lithium deposits to the McDermitt caldera complex, Nevada-Oregon.** Rytuba, J.J.; Glanzman, R.K. (Geological Survey, Menlo Park, CA (USA)). 1978. 32p. NTIS, PC A03/MF A01. Order Number DE83902682.

Portions are illegible in microfiche products.

The McDermitt caldera complex, located along the Nevada-Oregon border, is a Miocene collapse structure 45 kilometer in diameter. Large-volume rhyolitic and peralkaline ash-flow tuffs were erupted from 17.9 to 15.8 my ago, leading to the formation of over-

lapping and nested calderas. Emplacement of rhyolitic ring domes, located primarily along the western margin of the calderas, represents the last phase of volcanic activity. The complex is the site of large deposits of mercury, an ore deposit and several occurrences of uranium, and widespread occurrences of lithium. Mercury deposits at Cordero, McDermitt, Bretz, Ruja, and Opalite occur along ring fractures in sedimentary rocks that fill the calderas. Near the deposits the rocks are altered to zeolites and within the ore zones to potassium feldspar and silicate minerals. Although the mercury deposits contain anomalous concentrations of uranium, the most important uranium occurrences are restricted to rhyolitic ring domes emplaced along the western margin of the calderas. Lithium occurrences are located in tuffaceous rocks that are altered to zeolites and potassium feldspar. Concentrations of lithium ranging from 0.1 to 0.68 percent are associated with the clay mineral hectorite. The rhyolitic rocks erupted from the McDermitt caldera complex are enriched in mercury, uranium, and lithium and are likely source rocks for these elements in the ore deposits. Tuffaceous caldera fill-sediment averages 0.29 ppM mercury, 22 ppM uranium, and 236 ppM lithium; large-volume ash-flow tuffs contain up to 0.26 ppM mercury, 20 ppM uranium, and 300 ppM lithium.

0502 Exploration

REFER ALSO TO CITATION(S) 53464, 53465, 54781

53467 (ARL/TR—050, pp 8-13) **Atmospheric dispersion of radon gas from a shallow, extended uranium ore body.** Leach, V.A.; Solomon, S.B.; O'Brien, R.S.; Lokan, K.H.; Wise, K.N.; Petchell, R. Jan 1983. NTIS (US Sales Only), PC A08/MF A01.

In Annual review of research projects 1981.

The effects of meteorological variables on the dispersal of radon and its daughters, under the simplifying condition that the radon is produced from a reasonably uniform, extended plane surface, have been investigated. The Yeelirrie ore body in Western Australia is situated in a semi-desert area, where temperature inversions occur frequently.

0503 Mining

REFER ALSO TO CITATION(S) 53604, 54896

53468 (MSHA/IR—1131) **Use of aircraft imagery in evaluating ground stability at open-pit uranium mines in Gas Hills, Wyoming.** Stahl, R.L. (Mine Safety and Health Administration, Denver, CO (USA). Health and Safety Analysis Center). 1983. 14p. NTIS, PC A02/MF A01. Order Number DE83903011.

This report presents an approach used to evaluate ground stability in open pit mining operations in the Gas Hills, Wyoming. The approach uses aircraft imagery to identify geologic features, such as fractures and faults, that can affect ground stability in surface mines. Operators in the Gas Hills are using this technology as a mine planning and design tool to avoid or to minimize the effects of fractures and faults on ground stability. This remote sensing tool is appealing because it is inexpensive, accurate, and one that permits rapid evaluation of a mining area on a local and regional scale.

0504 Feed Processing

53469 (CONF-830528—Summ., pp XII.13-XII.14) **Comparison of transports expected under different waste management concepts: determination of basic data for application in risk analyses.** Alter, U. (Gesellschaft fuer Reaktorsicherheit (GRS) mbH, Koeln, Germany); Mielke, H.G.; Wehner, G. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

0505 Enrichment

53470 (CONF-830528—Summ., pp X.5-X.6) **Gas centrifuge enrichment plant: a future transportation challenge.** Brooks, G.B.; Ford, C.L. Jr. (Oak Ridge Gaseous Diffusion Plant, Oak Ridge, TN). 1983. NTIS, PC A21/MF A01. Contract W-7405-ENG-26.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

0507 Fuels Production And Properties

REFER ALSO TO CITATION(S) 54243

53471 (PINSTECH/NCD—104) **Emission spectrographic carrier distillation technique for the determination of trace elements in nuclear fuel materials.** Rehana, I.; Qureshi, I.H. (Pakistan Inst. of Nuclear Science and Technology, Rawalpindi. Nuclear Chemistry Div.). Dec 1982. 50p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83702972.

The quality control of high purity uranium materials used for nuclear reactor fuel requires sensitive analytical methods. These methods should be capable of detecting and measuring trace level metallic impurities specially those having large neutron absorption cross-sections. Emission spectrography is widely used in quality control of nuclear fuels for the determination of trace metal impurities in uranium. Carrier distillation technique with a suitable carrier is commonly used for routine quantometric analysis. The limits of detection obtained by other methods involving chemical separation and pre-concentration are better than those for the carrier distillation technique. However, chemical separations are cumbersome and time-consuming and increase the possibility of contaminating the sample. Therefore, non-destructive techniques are preferred for routine analysis. In this study, investigations were made to evaluate various carrier distillation techniques and to develop a suitable technique for achieving optimum sensitivity. A mixed silver chloride gallium fluoride carrier was developed which was found to be the most suitable for obtaining adequate sensitivity for direct determination of trace impurities of routine interest in a single operation. Employing this technique about three thousand samples were analyzed.

53472 **Method for the recovery of uranium values from uranium tetrafluoride.** Kreuzmann, A.B. US Patent Application 6-437,082. 27 Oct 1982. 10p. Contract AC05-76OR01156.

The invention is a novel method for the recovery of uranium from dry, particulate uranium tetrafluoride. In one aspect, the invention comprises reacting particulate uranium tetrafluoride and calcium oxide in the presence of gaseous oxygen to effect formation of the corresponding alkaline earth metal uranate and alkaline earth metal fluoride. The product uranate is highly soluble in various acidic solutions whereas the product fluoride is virtually insoluble therein. The product mixture of uranate and alkaline earth metal fluoride is contacted with a suitable acid to provide a uranium-containing solution, from which the uranium is recovered. The invention can achieve quantitative recovery of uranium in highly pure form.

0508 Spent Fuels Reprocessing

REFER ALSO TO CITATION(S) 53619

53473 (CONF-8308111—1) **Breeder reactor fuel reprocessing.** Trauger, D.B. (Oak Ridge National Lab., TN (USA)). 1983. Contract W-7405-ENG-26. 5p. NTIS, PC A02/MF A01. Order Number DE83017220.

From Conference on the future of nuclear power; Nara, Japan (22 Aug 1983).

The time cycle for breeder reactor development and deployment is longer than the planning horizons for most private industry

and governments. The potential advantage and possible desperate need for widely deployed breeder reactors in the future seems to dictate that suitable long-term development and deployment programs be established to provide an adequate base of technology and in time to meet the need. The problems of failing to do so and being confronted with a major requirement for nuclear energy could result in very serious economic and social disruption. The cost of maintaining the needed program, although substantial, is certainly modest compared with the potential problems which could ensue should we fail to proceed.

53474 **(RHO-PB-SR—10-B-SUM-JUN-83) Rockwell Hanford Operations monthly report summary, June 1983.** (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). 1983. Contract AC06-77RL01030. 41p. NTIS, PC A03/MF A01. Order Number DE83016171.

Portions are illegible in microfiche products.

Shipment of the initial stable material from Pacific Northwest Laboratory 303-C Building in support of the Hanford Plutonium Scrap Processing Plan was initiated. Six shipments have been completed on schedule per the 303-C Shipping and Receiving Plan. Another PUREX Phase ID enhanced readiness test run of two weeks was successfully completed. The task to modify nine railroad well cars for PUREX fuel transportation support was completed one month ahead of schedule. The performance specification for the Helicopter Hangar/Support Facility was approved by Kaiser Engineers Hanford and Rockwell Hanford Operations on schedule. Combined jet pump production for TX and BY Tank Farms in the month of June was approximately 123,000 gal. The fiscal year-to-date volume pumped is about 315,000 gal versus 350,000 gal planned. The first shipments of N-Reactor decontamination waste were received from UNC via railroad tank cars in the first week of the month. Two to three shipments per week are being received and a total of thirty-three loads are expected to be received through the middle of August (about 500,000 gal of waste). Twenty-three cesium capsules were produced in June for a fiscal total of 100. A technical plan for the Transportable Grout Facility was approved, and submitted to DOE-Richland. This technical plan addresses the need and background, as well as the objective, strategy, work breakdown structure, schedule, and milestones. Completion of this technical plan represents a significant accomplishment in the grouting of defense nuclear wastes. Both PNL and ORNL participated by contributing to this plan. The final draft of Waste Form Acceptance Requirements for Spent Fuel, Commercial and Defense High-Level Waste, and Commercial Transuranic Waste for a Nuclear Waste Repository in Basalt was completed and transmitted to DOE-Richland.

53475 **Method for monitoring irradiated nuclear fuel using cerenkov radiation.** Caldwell, J.T.; Dowdy, E.J.; Nicholson, N. (to Dept. of Energy). US Patent 4,389,568. 21 Jun 1983. Filed date 21 May 1980. vp.

PAT-APPL-151870.

A method is provided for monitoring irradiated nuclear fuel inventories located in a water-filled storage pond wherein the intensity of the cerenkov radiation emitted from the water in the vicinity of the nuclear fuel is measured. This intensity is then compared with the expected intensity for nuclear fuel having a corresponding degree of irradiation exposure and time period after removal from a reactor core. Where the nuclear fuel inventory is located in an assembly having fuel pins or rods with intervening voids, the cerenkov light intensity measurement is taken at selected bright spots corresponding to the water-filled interstices of the assembly in the water storage, the waterfilled interstices acting as cerenkov light channels so as to reduce cross-talk. On-line digital analysis of an analog video signal is possible, or video tapes may be used for later measurement using a video editor and an electrometer. Direct measurement of the cerenkov radiation intensity also is possible using spot photometers pointed at the assembly.

53476 **Scrubbing of gaseous nitrogen oxides in packed towers.** Counce, R.M.; Perona, J.J. (Consolidated Fuel Reprocessing, Program, Oak Ridge National Laboratory, Oak Ridge, TN 37830). *AIChE (American Institute of Chemical Engineers) Journal;* **29**: No. 1, 26-32(Jan 1983). Contract W-7405-ENG-26.

Nitrogen oxide removal efficiencies of up to 97% were obtained in tests using columns packed with Intalox saddles. These studies were conducted at atmospheric pressure with water as the scrub solution and nitrogen oxide feed concentrations of up to 10%. A mathematical model based on mass-transfer, kinetic, and equilibrium data is presented; calculated removal efficiencies using this model agree very well with the experimental data.

0509 Transport And Storage

REFER ALSO TO CITATION(S) 53469, 53641, 53679, 53693, 53694, 53695, 53696, 53697, 53698, 53699, 53700, 53701, 53702, 53703, 53704, 53706, 53707, 53708, 53710, 53711, 53712, 53714, 53715, 53716, 53717, 54385, 54386, 54387, 54388, 54389, 54390, 54391, 54394, 54395, 54397, 54398, 54399, 54400, 54401, 54403, 54404, 54405, 54406, 54408, 54409, 54410, 54411, 54412, 54413, 54414, 54418, 54421, 54422, 54423, 54424, 54426, 54428, 54429, 54430, 54431, 54432, 54433, 54434, 54440, 54442, 54446, 54449, 54450, 54454, 54455, 54459, 54460, 54461, 54463, 54518

53477 **(CONF-830528—Summ.) PATRAM '83: 7th international symposium on packaging and transportation of radioactive materials.** (Oak Ridge National Lab., TN (USA)). 1983. Contract W-7405-ENG-26. 483p. NTIS, PC A21/MF A01. Order Number DE83012390.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

Portions are illegible in microfiche products.

Papers were presented at the following sessions: international regulations; materials, fracture toughness of ferritic steels; risk analysis techniques; storage in packagings; packaging design considerations; monolithic cast iron casks; risk analysis; facility/transportation system interface; research and development programs; UF_6 packagings; national regulations; transportation operations and traffic; containment, seals, and leakage; radiation risk experience; emergency response; structural modeling and testing; transportation system planning; institutional issues and public response; packaging systems; thermal analysis and testing; systems analysis; structural analyses; quality assurance; packaging and transportation systems; physical protection; criticality and shielding; transportation operations and experience; standards; shock absorber technology; and information and training for regulatory compliance. Individual summaries are title listed.

53478 (CONF-830528—Summ., pp I.3) **1984 revision of IAEA transport regulations.** Barker, R.F. (International Atomic Energy Agency, Vienna, Austria). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53479 (CONF-830528—Summ., pp I.4-I.5) **How safety procedures can follow the evolution in transport of RAM.** Sousselier, Y.; Grenier, M. (CEA, Fontenay-aux-Roses, France). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53480 (CONF-830528—Summ., pp I.6-I.7) **IAEA regulations for the safe transport of radioactive materials: revised A_1 and A_2 values.** Goldfinch, E.P. (Central Electricity Generating Board, London, England); Macdonald, H.F. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53481 (CONF-830528—Summ., pp I.8-I.9) **Transport of RAM in tanks: how to fit into the IAEA safety philosophy.** Schulz-Forberg, B.; Ulrich, A. (Bundesanstalt fuer Materialpruefung, Berlin, Germany). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53482 (CONF-830528—Summ., pp I.10-I.11) **IAEA's role in achieving and assuring safety in the transport of radioactive materials.** White, M.C. (International Atomic Energy Agency, Vienna, Austria). 1983. NTIS, PC A21/MF A01.
From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53483 (CONF-830528—Summ., pp I.12-I.13) **Carriage of radioactive substances in Europe in consideration of the provisions of the road traffic law, including the possibilities of taking into account the 1984 version of the IAEA regulations.** Ridder, K. (Ministry of Transport, Bonn, Germany). 1983. NTIS, PC A21/MF A01.
From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53484 (CONF-830528—Summ., pp I.14) **Licensing experience in obtaining approval of Type B packaging.** Vaughan, R.A. (Croft Associates, Didcot, England). 1983. NTIS, PC A21/MF A01.
From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53485 (CONF-830528—Summ., pp I.15-I.16) **Safety assessment and fire test on Type B packages of combustible thermal insulator for radioactive materials.** Shimade, H.; Miyazaki, S.; Matsubara, Y. (Fire Research Inst., Tokyo, Japan). 1983. NTIS, PC A21/MF A01.
From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53486 (CONF-830528—Summ., pp III.3-III.4) **Benchmarking of RADTRAN II.** Madsen, M.M.; Wilmot, E.L.; Taylor, J.M. (Sandia National Labs., Albuquerque, NM). 1983. NTIS, PC A21/MF A01.
From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53487 (CONF-830528—Summ., pp III.5-III.6) **Analysis of population densities along transportation routes.** Wilmot, E.L. (Sandia National Labs., Albuquerque, NM); Cashwell, J.W.; Joy, D.S. 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.
From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53488 (CONF-830528—Summ., pp III.7-III.8) **Simple risk analysis tool for estimating release fractions from shipments of 55-gallon drums involved in transportation accidents.** Shirley, C.G. (Sandia National Labs., Albuquerque, NM). 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.
From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53489 (CONF-830528—Summ., pp III.9-III.10) **Worlwide risk assessment on the transportation of radioactive materials.** Ericsson, A.M.; Elert, M. (KEMAKTA Konsult AB, Stockholm, Sweden). 1983. NTIS, PC A21/MF A01.
From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53490 (CONF-830528—Summ., pp III.11-III.12) **Critical evaluation of the results given by the INTERTRAN code: an example of parametric analysis to study the influence of the various components on the final result.** De Marco, I.; Mancioppi, S.; Piermattei, S.; Scarpa, G. (ENEA-DISP, Rome, Italy). 1983. NTIS, PC A21/MF A01.
From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53491 (CONF-830528—Summ., pp III.13) **Evaluation of the radiological risk resulting from road transportation of tritiated water.** Menossi, C.; Segado, R.; Reyes, R. (Comision Nacional de Energia Atomica, Buenos Aires, Argentina). 1983. NTIS, PC A21/MF A01.
From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53492 (CONF-830528—Summ., pp III.15) **Acceptability criterion applicable to accidental cases in the transport of radioactive materials.** Biaggio, A.L. (Comision Nacional de Energia Atomica, Buenos Aires, Argentina). 1983. NTIS, PC A21/MF A01.
From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53493 (CONF-830528—Summ., pp IV.9) **Planning and experience on the dry storage of Diorit spend fuel.** Ospina, C.; Baatz, H.; Methling, D. 1983. NTIS, PC A21/MF A01.
From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53494 (CONF-830528—Summ., pp IV.10-IV.11) **Super Phenix spent fuel storage cask, Castor SPX.** Lauer, H. (Centrale Nucleaire Europeene a Neutrons Rapides S.A., Lyon, France); Michoux, H.; Hueggenberg, R.;Janberg, K.; Rittscher, D.; Renavot, J.M. 1983. NTIS, PC A21/MF A01.
From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53495 (CONF-830528—Summ., pp IV.12-IV.13) **Operating experience of cask-type dry storage and spent fuel performance.** Einfeld, K. (Deutsche Gesellschaft fuer Wiederaufarbeitung von Kernbrennstoffen mbH, Hannover, Germany); Fleisch, J.; Luehrmann, A.; Ramcke, K. 1983. NTIS, PC A21/MF A01.
From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53496 (CONF-830528—Summ., pp IV.14-IV.15) **TN 1300 transport/storage cask system.** Keese, H.; Anspach, W.; Christ, R. (Transnuklear GmbH, Hanau, Germany). 1983. NTIS, PC A21/MF A01.
From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53497 (CONF-830528—Summ., pp IV.16-IV.17) **Storage and transportation of spent fuel and high-level waste using dry storage casks.** Eggers, P.E. (Ridihalgh, Eggers & Associates, Inc., Columbus, OH). 1983. NTIS, PC A21/MF A01.
From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53498 (CONF-830528—Summ., pp VI.14) **Generic evaluation of the radiological impacts of transportation within the nuclear fuel cycle.** Luna, R.E.; Madsen, M.M.; Wilmot, E.L.; Taylor, J.M. (Sandia National Labs., Albuquerque, NM). 1983. NTIS, PC A21/MF A01.
From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53499 (CONF-830528—Summ., pp VI.15-VI.16) **Method of determination of A_2 for a mixture of radionuclides.** Jones, R.H.; Reese, R.T. 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53500 (CONF-830528—Summ., pp D.I.15) **Enhancing public acceptance through improving and enlarging public understanding.** Shepherd, E.W. (Sandia National Labs., Albuquerque, NM). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53501 (CONF-830528—Summ., pp D.I.16) **Transportation data base for the US Department of Energy.** Arrowood, L.F. (Oak Ridge Gaseous Diffusion Plant, TN). 1983. NTIS, PC A21/MF A01. Contract W-7405-ENG-26.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53502 (CONF-830528—Summ., pp D.I.25-D.I.26) **Legislative and Regulatory Information System: a research tool for transporting radioactive materials.** Fore, C.S.; Knox, N.P.; Fielden, J.M. (Oak Ridge National Lab., TN). 1983. NTIS, PC A21/MF A01. Contract W-7405-ENG-26.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53503 (CONF-830528—Summ., pp VII.5-VII.6) **Facility-transportation system interface at COGEMA: experience in the taking delivery of spent fuel.** Lenail, B. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53504 (CONF-830528—Summ., pp VII.7-VII.8) **WIPP design flexibility for defense TRU waste transportation systems interface.** Johnson, J.E. (Westinghouse Electric Corp., Albuquerque, NM). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53505 (CONF-830528—Summ., pp VII.11-VII.12) **Operational experience in loading spent fuel casks in European LWRs.** Herberholz, K. (NTL Nukleare Transportleistungen GmbH, Hanau, Germany); Aupetit, J. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53506 (CONF-830528—Summ., pp VII.13-VII.14) **Storage facility for casks awaiting shipment.** Sakai, T.; Nakajima, T. (Toyo Engineering Corp., Tokyo, Japan). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53507 (CONF-830528—Summ., pp VIII.A.3) **Current status of research and development for safe transport of nuclear materials in Japan.** Aoki, S. (Tokyo Inst. of Tech., Meguro-ku, Tokyo, Japan); Shimamura, S.; Fukuda, S.; Kawasaki, M.; Miura, M. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53508 (CONF-830528—Summ., pp VIII.A.4-VIII.A.5) **IAEA coordinated research programme on safe transport of radioactive materials.** Bernardo, B.C. (International Atomic Energy Agency, Vienna, Austria). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53509 (CONF-830528—Summ., pp VIII.A.6-VIII.A.7) **Overview of DOE/PNC joint program on transportation technology.** Kikuchi, S. (Power Reactor and Nuclear Fuel Development Corp., Tokyo, Japan); Kubo, M.; Jefferson, R.M.; Allen, G.C.; Yoshimura, H.R.; Carlson, K.A. 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53510 (CONF-830528—Summ., pp IX.3-IX.4) **Transport and storage of RAM: the role of BAM.** Schulz-Forberg, B. (Bundesanstalt fuer Materialpruefung, Berlin, Germany). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53511 (CONF-830528—Summ., pp IX.5-IX.6) **Proposed UK legislation to provide radiological protection for workers, with emphasis on its application to the transport of radioactive materials.** Holyoak, B. (Health and Safety Board, London, England); Shaw, K.B. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53512 (CONF-830528—Summ., pp IX.7) **Planning of railway transport of radioactive materials as a consequence of the public concern: the role of competent authority.** Orsini, A.; De Marco, I.; Faloci, C. (ENEA, Rome, Italy). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53513 (CONF-830528—Summ., pp IX.8) **Radioactive material transportation: the large quantity problem.** Blalock, L.G. (Dept. of Energy, Oak Ridge, TN); Taynton, L.F. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53514 (CONF-830528—Summ., pp IX.9-IX.10) **Special requirements for shipping plutonium.** Shirley, C.G.; Wilmot, E.L.; McClure, J.D.; Reese, R.T. (Sandia National Labs., Albuquerque, NM). 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53515 (CONF-830528—Summ., pp IX.11-IX.12) **Analyses of notification, routing, and packaging for shipments of nuclear materials.** Welles, B.W.; Pellettieri, M.W. (International Energy Associates Ltd., Washington, DC). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53516 (CONF-830528—Summ., pp X.3) **Overview of the US government's nuclear materials shipping program: past, present, future.** Garrison, R.F. (Dept. of Energy, Washington, DC). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53517 (CONF-830528—Summ., pp X.4) **Department of Energy: Transportation Operations and Management System.** Blalock, L.G. (Dept. of Energy, Oak Ridge, TN). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53518 (CONF-830528—Summ., pp X.7-X.8) **Cooperative government/nuclear industry intervention in achieving motor carrier rules uniformity for transporting radioactive material.** White, J. (J. White and Associates, Inc., Spokane, WA). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53519 (CONF-830528—Summ., pp X.9) **Controls necessary to assure regulatory compliance on radioactive material shipments.** Taylor, J.C. (Union Carbide Corp., Paducah, KY). 1983. NTIS, PC A21/MF A01. Contract W-7405-ENG-26.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53520 (CONF-830528—Summ., pp X.10-X.11) **Meeting the challenge of the future in international transport operations: a transporter's point of view.** Timm, U.E. (Transnuklear GmbH, Hanau, Germany). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53521 (CONF-830528—Summ., pp X.12) **Carrier's real world when transporting radioactive materials for the United States government.** Kuhna, S.J.; Buckman, A.; Roach, M.S. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53522 (CONF-830528—Summ., pp X.13-X.14) **Spent fuel: transportable.** Kelly, J.J. (A.J. Metler Hauling & Rigging, Inc., Knoxville, TN). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53523 (CONF-830528—Summ., pp XII.11-XII.12) **Truck transportation in the nuclear fuel cycle.** Madsen, M.M.; Wilmot, E.L. (Sandia National Labs., Albuquerque, NM). 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53524 (CONF-830528—Summ., pp D.II.10-D.II.11) **Packaging of plutonium and high-enriched uranium safeguards samples for transport.** Andersen, J.A. (Sandia National Labs., Albuquerque, NM). 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53525 (CONF-830528—Summ., pp D.II.12-D.II.13) **US accident/incident experience in the transportation of nuclear fuel cycle material (1971-1982).** Emerson, E.L. (Sandia National Labs., Albuquerque, NM). 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53526 (CONF-830528—Summ., pp D.II.22) **Shipping papers: cornerstone of radioactive material transportation.** Yarborough, R.D. (Y-12 Plant, Oak Ridge, TN); Schermerhorn, J.R.; Henry, B.E.; Reed, H.C. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53527 (CONF-830528—Summ., pp D.II.23-D.II.24) **Combined storage for LWR spent fuel and high-level waste.** Baxter, B.J.; Ganley, J.T. (GA Technologies Inc., San Diego, CA). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53528 (CONF-830528—Summ., pp XIII.11-XIII.12) **US Department of Energy sponsored techniques for computerzed transportation routing analysis.** Joy, D.S. (Oak Ridge National Lab., TN); Johnson, P.E.; Blalock, L.G.; Cashwell, J.W. 1983. NTIS, PC A21/MF A01. Contract W-7405-ENG-26;AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53529 (CONF-830528—Summ., pp XV.6-XV.7) **Operating experience with two transport storage casks for surface storage of spent HTGR fuel elements.** Brinkmann, H.U. (KFA, Juelich, Germany); Duwe, R.; Engelstaedter, R.; Fleisch, J.; Luehrmann, A. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53530 (CONF-830528—Summ., pp XV.8-XV.9) **Shipping cask demand associated with US government storage of commercial spent fuel.** Daling, P.M.; Engel R.L. (Pacific Northwest Lab., Richland, WA). 1983. NTIS, PC A21/MF A01. Contract AC06-76RL01830.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53531 (CONF-830528—Summ., pp XV.12) **Review of selected nuclear transport event case histories.** Grella, A.W. (Nuclear Regulatory Commission, Washington, DC). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53532 (CONF-830528—Summ., pp XVI.3-XVI.4) **Need to increase public awareness of the safety of radioactive materials transport.** Bishop, R.W. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53533 (CONF-830528—Summ., pp XVI.5-XVI.6) **Recent development in the area of insurance and indemnity coverage for transportation of radioactive materials in the United States.** Brown, O.F. II. (Schwartzstein & Brown, Washington, DC). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53534 (CONF-830528—Summ., pp XVI.7-XVI.8) **Perceptions of risk in transporting radioactive material.** Shepherd, E.W.; Reese, R.T. (Sandia National Labs., Albuquerque, NM). 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53535 (CONF-830528—Summ., pp XVI.9) **Importance of reportable events on the public acceptance.** Wehner, G. (Federal Ministry of the Interior, Bonn, Germany). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53536 (CONF-830528—Summ., pp XVI.10-XVI.11) **Low-level waste transportation: legislative issues in the northeast United States.** Wight, A.; Goldsmith, M.; Murphy, J. (New Hampshire Legislature, Concord). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53537 (CONF-830528—Summ., pp XVI.12-XVI.13) **Analysis of NEPA/CEQ requirements with respect to nuclear materials packaging and transportation.** Welles, B.W.; Ross, K.E.L.; Pellettieri, M.W. (International Energy Associates Ltd., Washington, DC). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53538 (CONF-830528—Summ., pp XVI.14) **Significant recent developemnts in the United States courts affecting nuclear materials transportation.** DiStefano, J. (Dept. of Energy, Washington, DC). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53539 (CONF-830528—Summ., pp XVI.15-XVI.16) **Beyond the Association of American Railroads and Department of Energy workshop in 1981.** Carlson, K.A. (Dept. of Energy, Albuquerque, NM); Garrison, R.F.; Hardin, E.C. Jr. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53540 (CONF-830528—Summ., pp XVII.13-XVII.14) **SSITS cask: a capsule transportation system.** Sutherland, S.H.; Eakes, R.G.; Kempka, S.N. (Sandia National Labs., Albuquerque, NM). 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53541 (CONF-830528—Summ., pp XVII.16-XVII.17) **Cargo-restraint-transporter (CRT): a proven method of handling drum-type containers on safe-secure trailers (SSTs).** Ramsey, W.E.; Burger, T.N. (Y-12 Plant, Oak Ridge, TN). 1983. NTIS, PC A21/MF A01. Contract W-7405-ENG-26.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53542 (CONF-830528—Summ., pp XVIII.3) **Thermal analysis of packaging using the integral method.** Lake, W.H. (Nuclear Regulatory Commission, Washington, DC). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53543 (CONF-830528—Summ., pp XVIII.4-XVIII.5) **Heat transfer in a dry horizontal spent LWR fuel assembly (experimental validation of the computer code RIGG).** Fry, C.J. (UK Atomic Energy Authority, Winfrith, England); Livesey, E.; Spiller, G.T.; MacGregor, B.R. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53544 (CONF-830528—Summ., pp XVIII.11-XVIII.12) **Thermal testing in support of the TRUPACK development program.** Diggs, J.M.; Yoshimura, H.R.; Uncapher, W.L. (Sandia National Labs., Albuquerque, NM). 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53545 (CONF-830528—Summ., pp D.III.5-D.III.6) **Proposal of guidelines for selecting optimum options in packaging and transportation systems of spent fuel.** Saegusa, T.; Abe, H.; Fukuda, S. (Central Research Inst. of Electric Power Industry, Tokyo, Japan). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53546 (CONF-830528—Summ., pp D.III.9) **RAMPAC: a database of certified packaging for radioactive materials.** Haaker, C.K. (Sandia National Labs., Albuquerque, NM). 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53547 (CONF-830528—Summ., pp D.III.10-D.III.11) **Use of computers for meeting future challenges in traffic management.** Ford, C.L. Jr. (Oak Ridge Gaseous Diffusion Plant, TN). 1983. NTIS, PC A21/MF A01. Contract W-7405-ENG-26.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53548 (CONF-830528—Summ., pp D.III.12) **Nuclear criticality safety analysis of the Oak Ridge Y-12 plant birdcage-type containers for intraplant storage and transportation.** Stachowiak, R.V. (Y-12 Plant, Oak Ridge, TN). 1983. NTIS, PC A21/MF A01. Contract W-7405-ENG-26.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53549 (CONF-830528—Summ., pp D.III.13-D.III.14) **Radioactive materials transportation: state regulation and enforcement.** Kinley, H.J. (Resource Communities, Inc., Santa Fe, NM). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53550 (CONF-830528—Summ., pp D.III.15-D.III.16) **Metal integrated container as part of an integrated system for back-end of irradiated fuel management.** Teper, B. (Ontario Hydro, Toronto). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53551 (CONF-830528—Summ., pp D.III.17-D.III.18) **Implementation of HM-164: an historical perspective.** Taynton, L.F. (Science Applications, Inc., Oak Ridge, TN); Blalock, L.G. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53552 (CONF-830528—Summ., pp D.III.22-D.III.23) **Design and testing of scale model transport systems.** Joseph, B.J. (Sandia National Labs., Albuquerque, NM). 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53553 (CONF-830528—Summ., pp D.III.24-D.III.25) **Assessment of the safety of spent fuel transportation in urban environs.** Sandoval, R.P. (Sandia National Labs., Albuquerque, NM). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53554 (CONF-830528—Summ., pp XIX.3-XIX.4) **Planning a transportation system for US defense transuranic waste.** Gilbert, K.V. (Rockwell International, Golden, CO); Hurley, J.D.; Smith, L.J.; McFadden, M.H.; Raudenbush, M.H. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53555 (CONF-830528—Summ., pp XIX.5-XIX.6) **Estimated transportation cost and risk for operation of a nuclear waste repository at candidate sites.** Peterson, R.W. (Battelle Memorial Inst., Columbus, OH); Varadrajan, R.V.; McSweeney, T.I.; Cashwell, J.W.; Wilmot, E.L.; Joy, D.S. 1983. NTIS, PC A21/MF A01. Contract AC06-76RL01830;AC04-76DP00789;W-7405-ENG-26.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53556 (CONF-830528—Summ., pp XIX.9-XIX.10) **Cost model for the transportation of nuclear wastes.** Cashwell, J.W. (Sandia National Labs., Albuquerque, NM); Reese, R.T.; Romesberg, L.E.; Shepherd, E.W.; Flaming, R.M. 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53557 (CONF-830528—Summ., pp XIX.13-XIX.14) **Spent fuel shipping costs for transportation logistics analyses.** Cole, B.M. (Pacific Northwest Lab., Richland, WA); McNair, G.W.; Cross, R.E.; Votaw, E.F.; Cashwell, J.W. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53558 (CONF-830528—Summ., pp XXII.A.3-XXII.A.4) **Notes on the design of ships used in the international transport of irradiated nuclear fuel.** Spink, H.E. (British Nuclear Fuels Ltd., Risley, England). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53559 (CONF-830528—Summ., pp XXII.A.5) **Realization of a sea transport system for radioactive material.** Gustafsson, B. (Swedish Nuclear Fuel Supply Co., Stockholm, Sweden); Lenail, B. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53560 (CONF-830528—Summ., pp XXII.A.8-XXII.A.10) **Transport of fast breeder reactor spent fuel in gas-filled casks.** Geffroy; Dobremelle; Liot; Vallepin; Frachet. (Saclay Nuclear Research Center, France). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53561 (CONF-830528—Summ., pp XXIII.3-XXIII.4) **Criticality aspects of the transport of fissile materials.** Schweer, H.H. (Physikalisch-Technische Bundesanstalt Braunschweig, Germany). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53562 (CONF-830528—Summ., pp XXIII.7) **Criticality control of packagings loaded with nuclear spent fuel.** Cagnon, R. (Transnucleaire, Paris, France). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53563 (CONF-830528—Summ., pp XXIII.16-XXIII.17) **Criticality experiment program in support of nuclear materials transportation systems.** Bierman, S.R. (Pacific Northwest Lab., Richland, WA). 1983. NTIS, PC A21/MF A01. Contract AC06-76RL01830.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53564 (CONF-830528—Summ., pp XXIV.5-XXIV.6) **20 years experience of large-scale movement of irradiated fuel by the CEGB.** Mummery, G.B. (Central Electricity Generating Board, London, England). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53565 (CONF-830528—Summ., pp XXIV.7-XXIV.8) **Transport of irradiated fuel to the La Hague reprocessing plant.** Lenail, B. (COGEMA, Velizy Villacoublay, France); Curtis, H.W. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53566 (CONF-830528—Summ., pp XXIV.15-XXIV.16) **MTR irradiated fuel transports.** Mangusi, J. (Transnuclear, Inc., White Plains, NY); Hannett, B.; Staake, T. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53567 (CONF-830528—Summ., pp XXV.3-XXV.4) **ANSI N14 standards committee.** Clark, J.R. (Nuclear Fuel Services, Rockville, MD); Tarnuzzer, E.C.; Trujillo, A.A. 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53568 (CONF-830528—Summ., pp XXV.5) **Construction and inservice inspection rules for nuclear spent fuel and high-level waste transport packagings.** Goldmann, K. (Transnuclear, Inc., White Plains, NY); Brinkman, W.H.; Canonico, D.A.; Claverie, R.J.; Nickell, R.E. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53569 (CONF-830528—Summ., pp XXV.6-XXV.7) **Stowing of packages containing radioactive materials on conveyances in normal and accidental conditions.** Draulans, J. (TRANSNUBEL, Dessel, Belgium); Lafontaine, I.; Augin, B.; Gilles, P. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53570 (CONF-830528—Summ., pp XXV.8) **Design rules for containment systems of nuclear spent fuel and high-level waste transport packagings.** Nickell, R.E. (Electric Power Research Inst., Palo Alto, CA). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53571 (CONF-830528—Summ., pp XXV.9-XXV.10) **Transportation system preconceptual description for subseabed disposal of high-level waste.** Shirley, C.G. (Sandia National Labs., Albuquerque, NM); McClure, J.D.; Miller, M.; Chryssostomidis, C.; Giovanetti, R.C.; Wee, C.S. 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53572 (CONF-830528—Summ., pp XXV.11) **International ISO standards on packaging and transport of radioactive materials.** Becker, K. (ISO/TC 85 Nuclear Energy, Berlin, Germany); Smith, D.R. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53573 (CONF-830528—Summ., pp XXVII.3) **Problems of the educational training: quality and quantity of the workers involved in the transport of radioactive materials.** Faloci, C. (ENEA, Rome, Italy). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53574 (CONF-830528—Summ., pp XXVII.4-XXVII.5) **Compliance training.** Reed, H.C. (Science Applications, Inc., Oak Ridge, TN); Bloomberg, D.J.; Blalock, L.G. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53575 (CONF-830528—Summ., pp XXVII.6-XXVII.7) **Radioactive material information program.** Blalock, L.G. (Dept. of Energy, Oak Ridge, TN); Rymer, A.C. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53576 (CONF-830528—Summ., pp XXVII.8) **Caldecott tunnel fire thermal environments, regulatory considerations and probabilities.** Larson, D.W.; Reese, R.T.; Wilmot, E.L. (Sandia National Labs., Albuquerque, NM). 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53577 (CONF-830528—Summ., pp XXVII.9-XXVII.10) **Radioactive material transportation (RAMT) shipment study.** Lyman, T.R.; McClure, J.D. 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53578 (CONF-830528—Summ., pp XXVII.11-XXVII.12) **Regulation versus reality.** Jefferson, R.M.; McClure, J.D. (Sandia National Labs., Albuquerque, NM). 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53579 (CONF-830528—Summ., pp E.3-E.4) **DOE transportation programs: computerized techniques.** Joy, D.S.; Johnson, P.E.; Fore, C.S.; Peterson, B.E. (Oak Ridge National Lab., TN). 1983. NTIS, PC A21/MF A01. Contract W-7405-ENG-26.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53580 (DOE/AL/10752—24) **Potential problems from shipment of high-curie content contact-handled transuranic (CH-TRU) waste to WIPP.** Neill, R.H.; Channell, J.K. (New Mexico Health and Environment Dept., Santa Fe (USA). Environmental Improvement Div.). Aug 1983. Contract AC04-78AL10752. 32p. NTIS, PC A03/MF A01. Order Number DE83017565.

There are about 1000 drums of contact-handled transuranic (CH-TRU) wastes containing more than 100 Ci/drum of Pu-238 that are stored at the Savannah River Plant and at the Los Alamos National Laboratory. Studies performed at DOE laboratories have shown that large quantities of gases are generated in stored drums containing 100 Ci of ^{238}Pu. Concentrations of hydrogen gas in the void space of the drums are often found to be high enough to be explosive. None of the analyses in the DOE WIPP Final Environmental Impact Statement, Safety Analysis Report, and Preliminary Transportation Analysis have considered the possibility that the generation of hydrogen gas by radiolysis may create an explosive or flammable hazard that could increase the frequency and severity of accidental releases of radionuclides during transportation or handling. These high ^{238}Pu concentration containers would also increase the estimated doses received by individuals and populations from transportation, WIPP site operations, and human intrusion scenarios even if the possibility of gas-enhanced releases is ignored. The WIPP Project Office has evaluated this effect on WIPP site operations and is suggesting a maximum limit of 140 ^{239}Pu equivalent curies (P-Ci) per drum so that postulated accidental off-site doses will not be larger than those listed in the FEIS. The TRU-PACT container, which is being designed for the transportation of CH-TRU wastes to WIPP, does not appear to meet the Nuclear Regulatory Commission regulations requiring double containment for the transportation of plutonium in quantities >20 Ci. A 20 alpha Ci/shipment limit would require about 200,000 shipments for the 4 million curies of alpha emitters slated for WIPP.

53581 (ORNL/TM—8419) **HIGHWAY, a transportation routing model: program description and users' manual.** Joy, D.S.; Johnson, P.E.; Gibson, S.M. (Oak Ridge National Lab., TN (USA)). Dec 1982. Contract W-7405-ENG-26. 46p. NTIS, PC A03/MF A01. Order Number DE84000541.

A computerized transportation routing model has been developed at the Oak Ridge National Laboratory to be used for predicting likely routes for shipping radioactive materials. The HIGHWAY data base is a computerized road atlas containing descriptions of the entire interstate highway system, the federal highway system, and most of the principal state roads. In addition to its prediction of the most likely commercial route, options incorporated in the HIGHWAY model can allow for maximum use of interstate highways or routes that will bypass urbanized areas containing populations > 100,000. The user may also interactively modify the data base to predict routes that bypass any particular state, city, town, or specific highway segment.

53582 **(SAND—82-2778) Transporting spent reactor fuel: allegations and responses.** Jefferson, R.M. (Sandia National Labs., Albuquerque, NM (USA)). Mar 1983. Contract AC04-76DP00789. 14p. NTIS, PC A02/MF A01. Order Number DE83017652.

A January 1982 monthly newsletter from the Council on Economic Priorities (CEP) was entirely devoted to the presentation of a broad-ranging series of allegations that the transportation of spent fuel in particular, and other high-level radioactive materials by inference is currently being conducted in this country in an unsafe manner. This newsletter preceded the release of a book authored by Marvin Resnikoff on the same subject by over a year. This book titled The Next Nuclear Gamble contained substantially the same allegations as the newsletter, although the book devoted space to a greatly increased number of specific examples. This paper reduces those allegations contained in the executive summary and the recommendations contained in the last chapter of the book to a manageable number by combining the many specific issues into a few topics. Each of these topics is then addressed. As such, this is an abbreviated analysis of The Next Nuclear Gamble and does not address much of the fine detail. In spite of that, it would be possible to address each of the details within the book on a similar basis. The intent of this document is to provide background information for those who are questioned on the validity of the allegations made by the CEp.

53583 **Long-term dry storage demonstration with spent LWR fuel.** Fleisch, J.; Einfeld, K.; Luehrmann, A. (Deutsche Gesellschaft fuer Wiederaufarbeitung von Kernbrennstoffen mbH, Hannover (Germany, F.R.)). pp 16-27 of Proceedings of an NEA specialist workshop on dry storage of spent fuel elements. Paris (France); OECD (1982). (CONF-820578—).

From OECD specialist workshop on techniques for the dry storage of spent fuel elements; Madrid, Spain (11 May 1982).

Experience with dry storage of spent fuel in several countries has indicated the potential of this technology to provide a safe and in particular economic alternative interim storage concept. Among the several dry storage techniques operating worldwide, the concept of above-ground cask storage was selected in Germany. The program now underway is integrated with a series of single fuel pin tests as well as whole fuel bundle tests. The first operational data with a fully instrumented mobile storage cask of the CASTOR type are discussed. The major objective of the cask program is to expand the already worldwide available data base on fuel performance on a larger statistical scale. The experimental data base presented confirms the dry storage cask concept and the spent fuel storage conditions.

53584 **Development of a dry transport and storage cask for spent LWR fuel assemblies in Spain.** Melches, C. (Empresa Nacional del Uranio (ENUSA), Madrid (Spain)); Uriarte, A. (Junta de Energia nuclear (JEN), Madrid (Spain)); Espallardo, J.A. (Equipos Nucleares (ENSA), Madrid (Spain)). pp 28-37 of Proceedings of an NEA specialist workshop on dry storage of spent fuel elements. Paris (France); OECD (1982). (CONF-820578—).

From OECD specialist workshop on techniques for the dry storage of spent fuel elements; Madrid, Spain (11 May 1982).

One of the advantages of the cask storage concept is its flexibility which makes it specially attractive in the case of the Spanish circumstances. For these reasons the Empresa Nacional del Uranio, S.A. (ENUSA), Junta de Energia Nuclear (JEN) and Equipos Nucleares, S.A. (ENSA) initiated in 1981 a joint program for the development of a prototype cask for the dry transport and storage of spent fuel assemblies. This program includes as main steps the analysis of the conceptual design, the detailed design and experimental tests, the fabrication of a prototype and its licencing and safety testing. The mentioned program, which started in the early 1981, is scheduled to be completed at the end of 1984.

53585 **Spent fuel dry-storage system for Trino Vercellese nuclear power plant.** Cuzzaniti, M.; Zaffiro, B.; Felici, S.; Peroni, P.; Cane, G. (Ente Nazionale per l'Energia Elettrica, Roma (Italy)). pp 38-47 of Proceedings of an NEA specialist workshop on dry storage of spent fuel elements. Paris (France); OECD (1982). (CONF-820578—).

From OECD specialist workshop on techniques for the dry storage of spent fuel elements; Madrid, Spain (11 May 1982).

The paper describes ENEL's design of a dry-storage system for the irradiated fuel of Trino Vercellese nuclear plant, prepared in 1978 when a critical storage situation was envisaged. The project was carried out as far as obtaining the Italian Safety Authorities agreement, but was subsequently put aside as another solution became available.

53586 **MODREX: storage in concrete silos and/or iron casks.** Doroszlai, P. (Electrowatt Engineering Services Ltd., Zurich (Switzerland)). pp 52-64 of Proceedings of an NEA specialist workshop on dry storage of spent fuel elements. Paris (France); OECD (1982). (CONF-820578—).

From OECD specialist workshop on techniques for the dry storage of spent fuel elements; Madrid, Spain (11 May 1982).

The acronym MODREX stands for Modular Dry Expandable, a concept for the dry storage of LWR spent fuel elements in silo or casks. This double concept offers inherent safety, low exposure to the operating personnel and also significant operational and economic advantage. The silo storage facility consists of a receiving station for the transfer cask and a series of storage modules. The storage module - the basic element of the facility consists of an individually poured concrete monolithic structure containing nine vertical silo positions dissipating the decay heat of the enclosed fuel elements by a combination of passive convection cooling and heat pipes. Each silo receives one storage canister which in turn holds several LWR fuel elements or vitrified waste cylinders. It provides a safe and efficient means of handling the fuel. On the other hand, the MODREX storage cask consists of the same canister as used in silos, loaded in a nodular cast iron cask providing shielding and mechanical protection, as well as heat dissipation through fins.

53587 **Dry storage of spent fuels. French experience.** Sugier, A. (Commissariat a l'Energie Atomique (DgAEN), 75 - Paris (France)); Geffroy, J.J.; Dobremelle, M. (Commissariat a l'Energie Atomique (DEMT), CEN-Saclay, 91 - Gif-sur-Yvette (France)). pp 89-100 of Proceedings of an NEA specialist workshop on dry storage of spent fuel elements. Paris (France); OECD (1982). (In French)(CONF-820578—).

From OECD specialist workshop on techniques for the dry storage of spent fuel elements; Madrid, Spain (11 May 1982).

In France reprocessing has been choosen for the management of irradiated fuels, after a short storage in a pool. Therefore the CEA did not develop dry storage for intermediary PWR spent fuel storage. Nevertheless some experience was gained in this field by the study before realization in thermal and mechanical study laboratories and during conception, realization and exploitation of faciities with similar aims. The present paper describes this experience and presents some thoughts for a first feasibility study of a dry storage facility.

53588 **TN 1300 shipping/storage cask system for spent fuel.** Christ, R.; Anspach, W. (Transnuklear GmbH, Hanau (Germany, F.R.)). pp 101-108 of Proceedings of an NEA specialist workshop on dry storage of spent fuel elements. Paris (France); OECD (1982). (CONF-820578—).

From OECD specialist workshop on techniques for the dry storage of spent fuel elements; Madrid, Spain (11 May 1982).

Based upon its experience gained by development and operation of its transport casks, Transnuklear has designed a series of casks especially dedicated to dry intermediate storage. In the paper

the design features, manufacturing of prototypes and the status of testing and licensing will be described. It is shown that the system is applicable for storage of different types of fuel.

53589 **Dry storage instrumented bundle experiments.** Kaspar, G.; Peehs, M. (Kraftwerk Union Aktiengesellschaft, Erlangen (Germany, F.R.)); Fleisch, J. (Deutsche Gesellschaft fuer Wiederaufarbeitung von Kernbrennstoffen mbH, Hannover (Germany, F.R.)); Unger, H. (Kernkraftwerk Obrigheim GmbH, Obrigheim (Germany, F.R.)). pp 114-124 of Proceedings of an NEA specialist workshop on dry storage of spent fuel elements. Paris (France); OECD (1982). (CONF-820578—).

From OECD specialist workshop on techniques for the dry storage of spent fuel elements; Madrid, Spain (11 May 1982).

Analysis of the potential degradation mechanisms for spent LWR fuel under dry storage indicates that hoop strain would appear to limit the insertion temperature to 400°C. To demonstrate the storage performance, two tests are conducted at t(max) = 300°C (2 kW decay heat) and t(max) = 400°C (3 kW decay heat). The fuel elements are composed of different design and burnup up to an average rod burnup of more than 40 GWd/tU accumulated in 4 reactor cycles. The experiments are instrumented with thermocouples and equipped with a gas monitoring line. Experiment No. 1 (t(max) = 300°C) was terminated after 60 days. Experiment No. 2 (t(max) = 400°C) is still in operation. There is no indication of any defect.

53590 **Spent fuel behavior in dry storage.** Johnson, A.B. Jr.; Pankaskie, P.A.; Gilbert, E.R. (Pacific Northwest Laboratory, Richland, WA (USA)). pp 125-149 of Proceedings of an NEA specialist workshop on dry storage of spent fuel elements. Paris (France); OECD (1982). (CONF-820578—).

From OECD specialist workshop on techniques for the dry storage of spent fuel elements; Madrid, Spain (11 May 1982).

Dry storage is emerging as an attractive and timely alternative to complement wet storage and assist utilities to meet interim storage needs. Spent fuel has been handled and stored under dry conditions, at least for brief periods, almost from the beginning of nuclear reactor operation. Dry well and vault facilities have been used to store certain types of fuel since 1964; and more recently, programs have developed to demonstrate dry storage of irradiated Zircaloy-clad fuel in metal casks, dry wells, silos, and vaults. Hot cell and laboratory studies are also under way to investigate specific phenomena related to cladding behavior in dry storage. A substantial fraction of the U.S. light-water reactor spent fuel inventory has aged for relatively long times and has relatively low decay heats, which suggests that much of the U.S. fuel inventory can be stored at relatively low temperatures. Alternatively, rod consolidation of older fuel can be considered without exceeding maximum cladding temperatures. As interim dry storage concepts develop, consideration should be given, where practical, to measures that will simplify future fuel management operations, i.e., reprocessing and/or geologic disposal.

53591 **Dry storage concepts and their thermodynamic layout.** Schoenfeld, R. (NUKEM GmbH, Hanau (Germany, F.R.)). pp 150-160 of Proceedings of an NEA specialist workshop on dry storage of spent fuel elements. Paris (France); OECD (1982). (CONF-820578—).

From OECD specialist workshop on techniques for the dry storage of spent fuel elements; Madrid, Spain (11 May 1982).

The two favourable dry storage concepts being under consideration in the Federal Republic of Germany are presented and the physical behaviour or natural convection cooling with air is explained. With the three examples cask store, vault storage horizontally and vertically arranged the main thermodynamical design parameters and their influence on the efficiency of the cooling system and on the temperature distribution inside the store and of the stored material are discussed. Moreover, the importance of the fulfilment and the harmony of all safety criteria and the difficulties while to do so are carried out especially with the vault store.

53592 **Construction of JRR-3 spent fuel dry storage facility.** Adachi, M. (Japan Atomic Energy Research Institute, Tokai (Japan)). pp 161-172 of Proceedings of an NEA specialist workshop on dry storage of spent fuel elements. Paris (France); OECD (1982). (CONF-820578—).

From OECD specialist workshop on techniques for the dry storage of spent fuel elements; Madrid, Spain (11 May 1982).

To store the JRR-3 metallic natural uranium spent fuel elements, a dry storage facility has been constructed in JAERI. This facility has a capacity of about 30T of uranium. The elements are placed in encapsulated canister, then stored in drywell in the store. The store is basically an ordinary concrete box, about 12m long, 13m wide, and 5m deep. The store comprises a 10 x 10 lattice array of the drywells. The drywell consists of a stainless steel liner which is 2.5m deep, 36cm ID and 0.8cm thickness. A drywell also has an air inlet, outlet pipe for radiation monitoring and a shield plug in carbon steel for radiation protection. A canister which consists of stainless steel with 0.5cm thickness contains 36 elements. Sealing of the canister is accomplished by fusion welding.

53593 **Intermediate dry storage of the spent fuel of reactor DIORIT.** Ospina, C. (Swiss Federal Insitute for Reactor Research (EIR), Wuerenlingen (Switzerland)). pp 173-185 of Proceedings of an NEA specialist workshop on dry storage of spent fuel elements. Paris (France); OECD (1982). (CONF-820578—).

From OECD specialist workshop on techniques for the dry storage of spent fuel elements; Madrid, Spain (11 May 1982).

The storage of the spent fuel of the reactor DIORIT is required, until it is either reprocessed or conditioned for final disposal. Different storage concepts have been studied as alternative to actual water pools; as a result it has been decided to store the spent fuel in a dry transport and storage casks. The project is well advanced, the cask is under construction and the fuel loading facilities are being implemented; this facilitates the decommissioning of the reactor DIORIT.

53594 **Operating experience of vault type dry storage and its relevance to future storage needs.** Maxwell, E.O. (Central Electricity Generating Board Europa House, Cheadle Health (UK)); Deacon, D. (GEC Energy Systems Limited, Whetstone (UK)). pp 190-217 of Proceedings of an NEA specialist workshop on dry storage of spent fuel elements. Paris (France); OECD (1982). (CONF-820578—).

From OECD specialist workshop on techniques for the dry storage of spent fuel elements; Madrid, Spain (11 May 1982).

An outline description is given of the early passive cooled vault type dry stores for irradiated Magnox fuel at the Wylfa Nuclear Power Station together with the valuable operating experience gained over many years. The world's first air-cooled vault type dry store (350 Te) is described and comments on its construction and successful operation are made. The basic principles that were used in the design of this store and how these principles have been developed for use on vault type storage systems for oxide fuel and vitrified waste are given. An examination of the basic parameters that the authors consider should be used to measure the adequacy of the many storage options currently being considered around the world is included in order that a better assessment of the various systems may be obtained.

53595 **Status of dry storage of irradiated fuel in Canada.** Tabe, T. (Atomic Energy of Canada Limited, Whiteshell Nuclear Research Establishment, Pinawa, Manitoba (Canada)). pp 218-228 of Proceedings of an NEA specialist workshop on dry storage of spent fuel elements. Paris (France); OECD (1982). (CONF-820578—).

From OECD specialist workshop on techniques for the dry storage of spent fuel elements; Madrid, Spain (11 May 1982).

The irradiated fuel bundles discharged from Canada's nuclear power reactors are stored in water-pools. Air-cooled dry storage has been investigated as an alternative to water-pool storage. Conceptual design studies of away-from-reactor concrete canister and convection vault storage facilities for irradiated CANDU fuel were carried out by Atomic Energy of Canada Limited (AECL) and Ontario Hydro, respectively. In 1974, AECL began the development and demonstration of the concrete canister concept. Several con-

crete canisters were constructed for demonstration purposes as well as for storage of irradiated fuel. In 1978, a program was begun to assess the behaviour of fuel in a hot, dry environment. Other uses of concrete canisters, such as transport flasks for irradiated fuel and shielding for waste management experiments are reviewed.

53596 **Evaluation of the use of concrete casks for irradiated fuel management.** Naqvi, S.J.; Freire-Canosa, J.; Frost, C.R. (Ontario Hydro, Toronto (Canada)); Wasywich, K.M.; Wright, M.G. (Atomic Energy of Canada Ltd., WNRE Pinawa (Canada)). pp 229-238 of Proceedings of an NEA specialist workshop on dry storage of spent fuel elements. Paris (France); OECD (1982). (CONF-820578—).

From OECD specialist workshop on techniques for the dry storage of spent fuel elements; Madrid, Spain (11 May 1982).

The status of the Canadian Concrete Canister Dry Storage program is briefly reviewed. A preliminary evaluation indicates that significant cost savings, compared to a reference concept, could result from the use of a concrete canister (or cask, as a multi-purpose canister is called) for transportation and disposal, as well as storage. The on-going Canadian program to investigate the behaviour of defected and non-defected irradiated fuel in dry transportation and storage conditions is described. Results show that the definition of a maximum temperature for dry transportation and/or storage should be approached with caution.

53597 **Role of dry storage as a means to meet national storage needs in the United States.** Gormley, O.P. (U.S. Department of Energy, Washington (USA)). pp 241-253 of Proceedings of an NEA specialist workshop on dry storage of spent fuel elements. Paris (France); OECD (1982). (CONF-820578—).

From OECD specialist workshop on techniques for the dry storage of spent fuel elements; Madrid, Spain (11 May 1982).

This paper reviews the factors which seem to be governing the application of dry storage in the United States. It suggests that the rigorous technology is already well in hand and that it is technical perceptions which will govern in the licensing process. The paper traces the evolution of the U.S. program and shows how nontechnical issues are involved and suggests that the technical program managers should keep the perceptions in mind when defining their objectives. Finally, the paper summarizes spent fuel management cost data developed for IAEA technical working group on spent fuel management.

53598 **Technical and economic assessment of alternative dry storage methods.** Johnson, E.R.; McBride, J.A. (Johnson, E.R. Associates, Inc., Reston, VA (USA)). pp 65-78 of Proceedings of an NEA specialist workshop on dry storage of spent fuel elements. Paris (France); OECD (1982). (CONF-820578—).

From OECD specialist workshop on techniques for the dry storage of spent fuel elements; Madrid, Spain (11 May 1982).

The paper presents the results of an assessment of four alternative methods of dry storage of spent nuclear fuel in respect to the state of technology, licensability, implementation schedule and costs when the storage is used at a reactor location to supplement existing pool storage facilities. The methods of storage considered were storage in casks, drywells, concrete silos and air-cooled vaults. The impact of disassembly of spent fuel and storage of consolidated fuel rods was also determined. The economic assessments were based on the current projected storage requirements of a U.S. utility operating twin 824 MWe pressurized water reactors. Costs were estimated for a number of combinations of storage mode and packaging processes and considered storage of both intact assemblies and consolidated rods.

53599 **Economical dry storage of large amounts of spent fuel and vitrified high level radioactive waste.** Bokelmann, R.F.; Kuehnel, R.R.; Leidinger, B.J.G. (Kraftwerk Union AG, Offenbach (Germany, F.R.)). pp 79-88 of Proceedings of an NEA specialist workshop on dry storage of spent fuel elements. Paris (France); OECD (1982). (CONF-820578—).

From OECD specialist workshop on techniques for the dry storage of spent fuel elements; Madrid, Spain (11 May 1982).

The economical dry storage of spent fuel assemblies and vitrified high-level radioactive waste demands facilities that fulfill, besides safety requirements, especially the following criteria: minimization of the specific space required for the storage of one fuel assembly or glass cylinder, minimization of the number of active systems and components to alleviate operation and maintenance, application of current materials. Comprehensive thermodynamical calculations on the single and dual cycle dry storage facilities, developed by KWU, have shown that the flow and temperature distributions within the storage rack and the other parts of the facility determine the feasibility of such dry storage systems. The parameters are mainly governed by the orientation and the pitch of the storage racks.

0510 Marketing And Economics

REFER ALSO TO CITATION(S) 53556, 53598

53600 **(DOE/EIA—0403) 1982 survey of United States uranium marketing activity.** (USDOE Energy Information Administration, Washington, DC. Office of Coal, Nuclear, Electric and Alternate Fuels). Sep 1983. 89p. NTIS, PC A05/MF A01 - GPO. Order Number DE83018245.

This report is based on survey data from all utilities, reactor manufacturers, and uranium producers who market uranium. The survey forms are mailed in January of each year with updates in July of each year. This year 59 utilities, 5 reactor manufacturers and agents, and 57 uranium producers were surveyed. Completed survey forms were checked for errors, corrected as necessary, and processed. These data formed the basis for the development of the report. This report is intended for Congress, federal and state agencies, the nuclear industry, and the general public.

0520 Waste Management

REFER ALSO TO CITATION(S) 53474, 53497, 53504, 53527, 53571, 53580, 53599, 53689, 53690, 53691, 53713, 53935, 53935, 53988, 53997, 54005, 54008, 54377, 54442, 54450, 55080

53601 **(AAEC/E—550) Assessment of overseas developments in methods for treatment and disposal of high-level radioactive wastes.** Costello, J.M.; Wilson, E.G. (Australian Atomic Energy Commission Research Establishment, Lucas Heights). Oct 1982. 74p. NTIS (US Sales Only), PC A04/MF A01. Order Number DE83703468.

The principles of management and disposal of highly radioactive wastes contained in spent fuel from nuclear power generation are described. The status of developments in spent fuel reprocessing, high-level waste solidification and geologic isolation is reviewed. Some generic studies on the possible range of annual radiological doses to individuals from waste repositories are discussed and compared with doses from some existing nuclear power and fuel cycle operations, and with the dose received annually from an average background of naturally occurring radiation.

53602 **(AERE-R—10599) Preliminary assessment of polymer-modified cements for use in immobilisation of intermediate level radioactive waste.** Burnay, S.G.; Dyson, J.R. (UKAEA Atomic Energy Research Establishment, Harwell. Materials Development Div.). Nov 1982. 42p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83703469.

A range of polymer-modified cements has been examined as candidate materials for the immobilisation of intermediate level radioactive waste. The waste streams studied were inactive simulates of real wastes and included ion-exchange resins, Magnox debris and dilute sludges. Preliminary experiments on the compatibility of the polymer-cement-waste combinations have been carried out and measurements of flexural strength before and after γ-irradiation to 10^9 rad and water immersion have been made. Soxhlet leach tests have been used to compare the leach rates of the different materials. From the results of these preliminary experiments, a limited number of polymer-modified cements have been suggested as suitable for more detailed study.

53603 **(AERE-R—10665) Radioactive waste disposal by UKAEA establishments during 1981 and associated environmental monitoring results.** Flew, E.M. (UKAEA Atomic Energy Research Establishment, Harwell. Environmental and Medical Sciences Div.). Sep 1982. 27p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83703471.

This report gives details of the amounts of solid and liquid radioactive waste disposed of by the principal establishments of the UKAEA during 1981. Waste arising at the UKAEA Nuclear Power Development Laboratories at Windscale and Springfields, which are both situated on British Nuclear Fuels Ltd. (BNFL) sites, is disposed of by BNFL and included in their authorisations. Discharges to atmosphere of airborne radioactive waste are also included in the report. A summary of the results of the environmental monitoring programmes carried out in connection with the radioactive waste discharges is given.

53604 (ARL/TR—050, pp 1-2) **Study of radon emanation from waste rock at Northern Territory uranium mines.** Mason, G.C.; Gan, T.H.; Elliott, G. Jan 1983. NTIS (US Sales Only), PC A08/MF A01.

In Annual review of research projects 1981.

Field measurements were made of radon emanation rates from waste rock sources at Ranger, Nabarlek and Rum Jungle, three Northern Territory uranium mine sites. The preliminary mean emanation rate was approximately 50 Bq $m^{-2}s^{-2}$ per percent ore grade.

53605 **(CEA-CONF—6529) Vitrification processes for fission product solutions.** Bonniaud, R.; Jouan, A.; Moncouyoux, J.P.; Sombret, C. (Compagnie Generale des Matieres Nucleaires (COGEMA), Centre de Marcoule, 30 - Bagnols-sur-Ceze (France)). Oct 1982. 18p. (In French). (CONF-8210149—2). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703470.

From Annual meeting of the international commission on glass; Toronto, Canada (3 Oct 1982).

The different processes for fission product vitrification in the world are reviewed. Continuous or discontinuous processes, induction or arc heating, in can melting or casting, tests with radioactive or simulated wastes and industrial realizations are described.

53606 **(CEA-CONF—6530) Glass and nuclear wastes.** Sombret, C. (Compagnie Generale des Matieres Nucleaires (COGEMA), Centre de Marcoule, 30 - Bagnols-sur-Ceze (France)). Oct 1982. 17p. (In French). (CONF-8210149—1). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703087.

From Annual meeting of the international commission on glass; Toronto, Canada (3 Oct 1982).

Glass shows interesting technical and economical properties for long term storage of solidified radioactive wastes by vitrification or embedding. Glass composition, vitrification processes, stability under irradiation, thermal stability and aqueous corrosion are studied.

53607 (CONF-821005—, pp II.3-II.8) **Overview of decommissioning policy, standards and practices in NEA member countries.** Maestas, E.; Ilari, O. (OECD Nuclear Energy Agency, Paris, France). 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

Decommissioning refers to the orderly disposition of nuclear facilities after their retirement from service, taking account of environmental, radiation protection, waste management and safety considerations. The activities involved in such an exercise can vary from simple closure of the facility with a minimum removal of radioactive materials, to complete plant disassembly and restoration of the site for unrestricted release for other uses. As the nuclear industry matures, an increasing number of facilities have reached, or are approaching, the time when they will have to be withdrawn from active service and disposed of. To meet this forthcoming requirement, authorities in countries with nuclear power and nuclear research programs around the world must direct some effort in anticipation of the problems of decommissioning.

53608 (CONF-821005—, pp II.21-II.35) **Status of decommissioning program of US Nuclear Regulatory Commission.** Calkins, G.D. (US Nuclear Regulatory Commission, Washington, DC). 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

The program consists of the development of a detailed technology information base on the decommissioning of various kinds of nuclear facilities, research to improve the information base, the establishment of decommissioning criteria and the promulgation of regulations and guides to support the safe decommissioning of nuclear facilities. The technology information base is largely completed and research is underway to extend it. Key results from the information base are: (1) the technology is available to decommission the large variety of nuclear facilities that have been licensed by NRC; (2) the radiation exposure of the public during the decommissioning process is very small; (3) occupational exposure during the decommissioning process can be maintained acceptably low; (4) decommissioning costs are significant but manageable; and (5) the decommissioning of nuclear plants is facilitated by planning and appropriate design. (DP)

53609 (CONF-821005—, pp II.36-II.43) **Decommissioning of radioactively contaminated facilities from a state perspective.** Dornsife, W.P. (Pennsylvania Dept. of Environmental Resources, Harrisburg, PA). 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

Due to increased responsibility and awareness on the part of the states, the decommissioning of radioactively contaminated facilities is becoming of more concern. This paper discusses those issues which are felt to be of most concern to the states and recommends some directions for their resolution. These issues are: (1) disposal of decommissioning wastes; (2) residual radioactivity levels; (3) decommissioning of facilities which are state regulated; (4) funding for decommissioning; and (5) timing and mode of decommissioning.

53610 (CONF-821005—, pp III.1-III.9) **Waste management impacts of US decommissioning activities.** Oertel, G.K.; Kluk, A.F. (Dept. of Energy, Washington, DC). 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

US decommissioning activities for both the Department of Energy (DOE) and the Nuclear Regulatory Commission (NRC) are reviewed, and waste volume estimates are given. Waste volumes from recent reactor decommissioning projects are also given. The impacts of decommissioning policies on waste volumes are discussed. 15 references.

53611 (CONF-821005—, pp III.21-III.36) **Alternatives for management of wastes generated by the Formerly Utilized Sites Remedial Action Program.** Gilbert, T.L. (Argonne National Lab., IL); Peterson, J.M.; Vocke, R.W.; Alexander, J.K. 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

Alternatives for disposal or stabilization of the wastes generated by the Formerly Utilized Sites Remedial Action Program (FUSRAP) - which consist of soil material and rubble containing trace amounts of radionuclides - are identified and compared, with emphasis on the long-term aspects. A detailed pathway analysis for the dose to the maximally exposed individual is carried out using an adaptation of the natural analogue method. Comparisons of the different alternatives, based on the results of the pathway analysis and qualitative cost considerations, indicate that, if the hazard is such that the waste must be removed and disposed of rather than stabilized in place, disposal by immediate dispersal is preferable to containment, and containment followed by slow planned dispersal is preferable to containment without dispersal. 15 references, 2 figures, 4 tables.

53612 (CONF-821005—, pp IV.52-IV.66) **Decommissioning a plutonium fabrication facility.** Kline, W.H.; Lahey, T.J.; Moe, H.J. (Argonne National Laboratory, IL). 1982. NTIS, PC A99/MF A01. Contract W-31-109-ENG-38.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

In 1973, Argonne National Laboratory began consolidating and upgrading its plutonium-handling operations with the result that a research fuel-fabrication facility was shut down and declared surplus. Sixteen of the twenty-three gloveboxes which comprised the system were dismantled and relocated for reuse or placed into controlled storage during 1974 but, due to funding constraints, full-scale decommissioning did not start until 1978. Since that time the fourteen remaining contaminated gloveboxes, including all internal and external equipment as well as the associated ventilation systems, have been assayed for radioactive content, dissassembled, size reduced to fit acceptable packaging and sent to a US Department of Energy transuranic (TRU) retrievable-storage repository or to a low-level nuclear burial site. The project required 4 1/2 years to complete, 30 man-years of effort, produced some 560 m^3 (20,000 ft^3) of radioactive waste of which 70% was TRU, and cost around 2.2 million dollars. 2 references, 10 figures.

53613 (CONF-821005—, pp IV.67-IV.79) **Los Alamos DP West Plutonium Facility decontamination project.** Garde, R.; Cox, E.J.; Valentine, A.M. 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

The DP West Plutonium Facility operated by the Los Alamos National Laboratory, Los Alamos, New Mexico, was decontaminated between April 1978 and April 1981. The facility was constructed in 1944 to 1945 to produce plutonium metal and fabricate parts for nuclear weapons. It was continually used as a plutonium processing and research facility until mid-1978. Decontamination operations included dismantling and removing gloveboxes and conveyor tunnels; removing process systems, utilities, and exhaust ducts; and decontaminating all remaining surfaces. This report describes glovebox and conveyor tunnel separations, decontamination techniques, health and safety considerations, waste management procedures, and costs of the operation. 7 references, 8 figures, 1 table.

53614 (CONF-821005—, pp IV.80-IV.92) **Decontamination of the Frankford Arsenal.** Torrisi, S.P. (Army Toxic and Hazardous Materials Agency, Aberdeen, MD); Lillie, A.F. 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

During Frankford Arsenal's 161 years of operation, a variety of activities were conducted, including munitions manufacture, materials R & D, development of propellant and cartridge-actuated devices, and various procurement missions. In 1976, the facility was declared as excess to Army needs, and plans were put in place to decontaminate and clean up the Arsenal before transferring the property to the General Services Administration (GSA) for subsequent disposition and release for unrestricted use. The contaminants present at the Arsenal included depleted urnaium (from development and test activities associated with armor-piercing rounds) and radium (used for fire-control instrumentation/equipment). The US Army Toxic and Hazardous Materials Agency contract for decontamination and cleanup of the 110-acre facility was awarded to Rockwell International's Energy Systems Group in September 1979. The program was completed in January 1981, 1 month ahead of the contract deadline, and the property is now being released by GSA for unrestricted use. 6 figures, 2 tables.

53615 (CONF-821005—, pp IV.123-IV.131) **Mound's decommissioning experience, tooling, and techniques.** Combs, A.B.; Davis, W.P.; Elswick, T.C.; Garner, J.M.; Geichman, J.R. (Mound, Miamisburg, OH). 1982. NTIS, PC A99/MF A01. Contract AC04-76DP00053.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

Monsanto Research Corporation (MRC), which operates Mound for the Department of Energy (DOE), has been decommissioning radioactively contaminaed facilities since 1949. We are currently decommissioning three plutonium-238 contaminated facilities (approximately 50,000 ft^2) that contained 1100 linear ft of gloveboxes; 900 linear ft of conveyor housing; 2650 linear ft of dual underground liquid waste lines; and associated contaminated piping, services, equipment, structures, and soil. As of June, 1982, over 29,000 Ci of plutonium-238 have been removed in waste and scrap residues. As a result of the current and previous decommissioning projects, valuable experience has been gained in tooling and techniques. Special techniques have been developed in planning, exposure control, contamination control, equipment removal, structural decontamination, and waste packaging.

53616 (CONF-821005—, pp IV.144-IV.157) **Decommissioning of a tritium contaminated laboratory.** Harper, J.R.; Garde, R. (Los Alamos National Lab., NM). 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

A tritium laboratory facility at the Los Alamos National Laboratory, Los Alamos, New Mexico, was decommissioned in 1979. The project involved dismantling the laboratory equipment and disposing of the equipment and debris at an on-site waste disposal/storage area. The laboratory, constructed in 1953, was in service for tritium research and fabrication of lithium tritide components until 1974. The major features of the laboratory included 25 meters of gloveboxes and hoods, associated vacuum lines, utility lines, exhaust ducts, electrodryers, blowers, and laboratory benches. This report presents details on the decommissioning, health physics, waste management, environmental surveillance, and costs for the operation. 6 references, 22 figures, 3 tables.

53617 (CONF-821005—, pp IV.170-IV.180) **General Electric Fuels Laboratory decontamination and decommissioning.** Thompson, M.L.; Kurtz, E.F. (General Electric Co., Sunnyvale, CA). 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

This paper describes the General Electric Fuels Laboratory decontamination and decommissioning (D & D) activities initiated in 1979 and completed in 1982. The primary activities included Special Nuclear Material (SNM) conversion, packaging and shipping; and equipment and glovebox decontamination, removal, packaging and shipping. 5 figures.

53618 (CONF-821005—, pp IV.181-IV.184) **Gnome site decontamination and decommissioning project.** Orcutt, J.A.; Sorom, E.R. (Reynolds Electrical and Engineering Co., Inc., Las Vegas, NV). 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

In July 1977, DOe/Headquarters directed DOE/NV to design a decontamination and decommissioning plan for the Gnome site, 48 kilometers southeast of Carlsbad, New Mexico. The plan incorporated three distinct phases. During Phase I, both aerial and ground radiological surveys were conducted on the site. Radiological decontamination criteria were established, and a decontamination plan was developed based on the radiological survey results. During Phase II, site preparatory and rehabilitation work was completed. The actual land area decontamination was accomplished during Phase III with conventional earthmoving equipment. A gravity water injection system deposited 36,700 metric tons of contaminated soil and salt in the Gnome cavity. After completion of the decontamination and decommissioning operations, the Gnome site was returned to the Bureau of Land Management for unrestricted surface use.

53619 (CONF-821005—, pp IV.185-IV.198) **Decontamination and decommissioning of fuel reprocessing cells at the Idaho Chemical Processing Plant.** Smith, D.L. (EG & G Idaho, Inc., Idaho Falls). 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

This paper describes the decontamination and decommissioning of Fuel Process Cells A and B at the Idaho Chemical Processing Plant. Those cells are inactive and were decommissioned in February and July 1981. Twenty cells remain in operation at that

fuel reprocessing facility. Several safety precautions were taken during cell decommissioning: (1) a tent was built over the Cell A hatch to prevent contamination spread; (2) subatmospheric pressure was maintained inside the cells; (3) work inside the cells was performed by radiation-trained personnel fully dressed in anticontamination clothing and supplied-air respirators. Workers used pipe cutters and hand-held band saws to cut piping. All waste from both cells was handled as transuranic waste. The total waste volume generated during this project was 28 m^3. Following removal of equipment from the cells, each cell was decontaminated, radiologically characterized, and photographed. 8 figures, 2 tables.

53620 (CONF-821005—, pp V.18-V.34) **Development of improved technology for decommissioning operations.** Allen, R.P. (Pacific Northwest Lab., Richland, WA). 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

This paper describes the technology development activities conducted at Pacific Northwest Laboratory under US Department of Energy sponsorship to help ensure the availability of safe, cost-effective and environmentally sound decommissioning technology for radioactively contaminated facilities. These improved decommissioning technologies include techniques for the removal of contaminated concrete surfaces and coatings, adaptation of electropolishing and vibratory finishing decontamination techniques for field decommissioning applications, development of sensitive field instrumentation and methods for the monitoring of large surface areas, techniques for the field sectioning of contaminated components, improved contamination-stabilizing coatings and application methods, and development of a small solidification system for the field solidification of liquid waste. The results of cost/benefit studies for the vibratory finishing and sectioning technologies are also reported. 14 references, 1 table.

53621 (CONF-821005—, pp V.60-V.75) **Arc saw and its application to decommissioning.** Deichelbohrer, P.R. (Rockwell Hanford Operations, Richland, WA). 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

The arc saw is a toothless, circular saw that cuts by arc erosion. A model was built to study the arc saw's usefulness in cutting up radioactively contaminated metal scrap. It was chosen because it cuts with very little contact to the work piece and because cutting is not affected by material hardness. After installation of several improvements it was found it could cut almost any combination of metals and that clamping or fixturing requirements were minimum. Cutting proceeds rapidly and efficiently. 10 figures.

53622 (CONF-821005—, pp V.76-V.81) **Use of urethane foam in the decontamination and decommissioning of nuclear facilities.** Hermetz, R.E. (Mound Facility, Miamisburg, OH). 1982. NTIS, PC A99/MF A01. Contract AC04-76DP00053.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

The decontamination and decommissioning (D & D) of nuclear facilities described here is taking place at Mound Facility, an installation operated for the Department of Energy by Monsanto Research Corporation, and located in southwestern Ohio. The D & D work at Mound is underway in three areas: the Plutonium Processing Building, the Research Building, and the Waste Transfer System. All areas will be returned to a condition suitable for reallocating the area for other efforts. This work, started in 1978, is a multimillion-dollar effort scheduled to continue through 1987. Urethane foam is being used in a two-part spray system. It is used to coat interior surfaces of gloveboxes for the purpose of fixing contamination. This reduces the effort and cost of providing a safe and easily handled package. It is also used as packing material to stabilize the loads inside shipping containers. These urethane foams have proven to be cost-effective and time-saving. 4 figures.

53623 (CONF-821005—, pp V.90-V.99) **Cutting concrete with abrasion jet.** Yie, G.G. (Fluidyne Corp., Auburn, WA). 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

Fluidyne Corporation has developed a unique process and apparatus that allow selected abrasives to be introduced into high-speed waterjet to produce abrasive-entrained waterjet that has high material-cutting capabilities, which is termed by Fluidyne as the Abrasion Jet. Such Abrasion Jet has demonstrated capability in cutting hard rock and concrete at a modest pressure of less than 1360 bars (20,000 psi) and a power input of less than 45 kW (60 horsepower). Abrasion Jet cutting of concrete is characterized by its high rate of cutting, flexible operation, good cut quality, and relatively low costs. This paper presents a general description of this technology together with discussions of recent test results and how it could be applied to nuclear decontamination and decommissioning work. 8 references.

53624 (CONF-821005—, pp VI.1-VI.9) **Radiological planning and implementation for nuclear facility decommissioning.** Valentine, A.M. (Los Alamos National Lab., NM). 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

Radiation protection issues associated with nuclear facility decommissioning are described. Most of the discussion focuses on radiological issues that pertain to worker protection; however, issues concerning project support, environmental protection, and site release are also addressed. Issues are described in generic terms with full realization that the importance of the specific issues varies markedly depending on how the operation is performed and on the type of facility being decommissioned. General planning preoperational planning, project implementation, and project closeout phases of decommissioning projects are addressed. Recent nuclear facility decommissioning experience at the Los Alamos National Laboratory, a Department of Energy research and development laboratory, serves as the primary basis for the ideas and issues presented. 16 references.

53625 (CONF-821005—, pp VI.10-VI.27) **TRU waste assay instrumentation and applications in nuclear facility decommissioning.** Umbarger, C.J. (Los Alamos National Lab., NM). 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

The Los Alamos TRU waste assay instrumentation development program is described with application to decommissioning of outdated nuclear facilities. Field portable survey instruments are detailed for monitoring surfaces and soils. Bulk waste assay systems are then described for the analysis of drummed and crated wastes. 20 references, 7 figures, 1 table.

53626 (CONF-821005—, pp VI.28-VI.38) **Exemption of low-level decommissioning waste from controlled handling and disposal.** Devell, L. (Studsvik Energiteknik AB, Nykoeping, Sweden). 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

The decommissioning of a nuclear facility involves the management of a wide spectrum of materials with different levels of radioactivity. Some of them will be classified as radioactive waste of different kinds. Some parts with low activity could be released for reuse or upgrading. Low-level material could also be disposed of according to common waste techniques without having to utilize qualified disposal methods for waste containing more activity. Criteria for exemption of low-level material from controlled handling and disposal are discussed from basic ICRP principles and examples from the decommissioning of the R1 research reactor in Stockholm and the unrestricted release of materials from LWR under operation. Permission for exemption has to be based on a stringent source control, an optimization assessment and a radiological impact calculation. These topics are discussed in the report together with comparisons of radioactivity in commonly used material. 8 references, 2 tables.

53627 (CONF-821005—, pp VI.39-VI.53) **Waste identification, characterization and disposal during the D & D of a non-reactor nuclear facility.** Wynveen, R.A.; Moe, H.J.; Robinet, M.J. (Argonne National Lab., IL). 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

The principal health physics concern during the D & D of the New Brunswick Laboratory in New Jersey was assuring that no contaminated material was released for unrestricted use. The release criteria were based on removable and total contamination per 100 cm^2 of surface area. To increase the odds of not missing contaminants, all surfaces were surveyed at least three times with three portable instruments having different detection characteristics. In addition, smears were accomplished to measure removable contamination. Detailed documentation was done for all surveys. The structures were dismantled rather than demolished. All objects above the contamination criteria were placed directly into shipping bins. Two major difficulties were assuring detection of alpha contamination under painted surfaces in the plutonium area and maintaining high sensitivity gas-flow proportional survey instruments. The project was completed in 7 months with an average of less that 12 people at a cost of less than 10 person-years. Less than 50 pages of procedures were sufficient to satisfactorily complete the effort. The D & D site was left in a stable condition. 5 references, 9 figures, 3 tables.

53628 (CONF-821005—, pp VI.54-VI.84) **Radiation measurement capability for decontamination to unrestricted use.** Glenn, R.D.; Walker, E.; Haywood, F.F. 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

The measurement protocol for the decontamination program is based on an in-situ assessment of the radiological source present using portable and semi-portable radiation detectors, and to provide verification of these in-situ measurements by analyzing, using sophisticated counting lab techniques, samples taken from the measurement site. This permits a detailed radiological assessment using the simpler and less costly field instruments to provide the number of data points necessary to insure source term description. The more complex and costly sample counting is then applied to verify the results of the in-situ measurements. 13 figures, 4 tables.

53629 (CONF-821005—, pp VI.125-VI.138) **Classifying decommissioning wastes for allocation to appropriate final repositories.** Alder, J.C. (Nagra, Baden, Switzerland); Tunaboylu, K. 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

For the safe disposal of radioactive wastes in different repositories, it is of advantage to classify them in well-defined conditioned categories, appropriate for final disposal. These categories, the so-called waste sorts are characterized by similar radionuclide distribution, similar nuclide-specific activity concentrations and similar waste matrix. A methodology is presented for classifying decommissioning wastes and is applied to the decommissioning wastes arising from a Swiss program of 6 GWe. The amounts and nuclide-specific activity inventories of the decommissioning waste sorts have been estimated. A first allocation into two different repository types has been performed. Such a classification enables one to define the source parameters for repository safety analysis and allows one to allocate the different waste categories into appropriate final repositories. This work presents a first iteration to determine which waste sorts belong to which repository type. The characteristics of waste sorts have to be better defined and the protective strength of the repository barriers has to be optimized. 7 references, 2 figures, 4 tables.

53630 (CONF-821005—, pp VII.80-VII.84) **Quality assurance as a management tool in decommissioning activities.** Arter, D.R. (Hanford Engineering Development Lab., Richland, WA). 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

Quality assurance practices have been applied to the peaceful use of nuclear energy for many years. These practices are just as useful to the back end of the nuclear energy cycle as they are to the front end. The Department of Energy requires the application of quality assurance to all of its projects and programs. Quality assurance as a management tool consists of three fundamental elements: planning, execution and control. These elements should be applied to decommissioning activities by all parties, such that limited funds are wisely spent and the public is adequately protected. 1 table.

53631 (CONF-821005—, pp VII.85-VII.98) **Decommissioning alternatives for Savannah River Plant high-level waste tank 16.** Prendergast, J.T. Jr. (E.I. du Pont de Nemours & Co., Aiken, SC). 1982. NTIS, PC A99/MF A01. Contract AC09-76SR00001.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

As part of the waste management operations at Savannah River Plant (SRP), 24 waste tanks will be removed from service in the next 10 years. These tanks stored high-activity fission-product waste from nuclear fuel reprocessing operations at SRP. Waste Tank 16, in H Area at SRP, had earlier been removed from service in 1972 due to containment problems and later emptied. This report, using Tank 16 as a basis, assesses costs and radiological doses for four methods of decommissioning: 30-year layaway, immediate entombment, immediate dismantlement, and 30-year delayed dismantlement. The 30-year layaway alternative would cost about $0.9 million with a workforce dose of about 2 man-rem. Immediate entombment would cost about $4 million with an occupational dose of 10 man-rem. Immediate dismantlement would cost about $36 million. The workforce dose would be approximately 93 man-rem. The 30-year delayed dismantlement alternative would cost about $32 million with an associated workforce dose of 47 man-rem. All costs are in 1982 dollars and are not discounted. 4 figures, 5 tables.

53632 (CONF-821005—, pp VII.139-VII.152) **Characterization of nuclear fuel cycle facilities requiring decommissioning and decontamination.** Bernhardt, D.E.; Sutherland, A.A.; Grant, M.W.; Rich, D.C. (Rogers and Associates Engineering Corp., Salt Lake City, UT). 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

This paper presents information to characterize the decommissioning and decontamination (D & D) wastes from uranium fuel cycle facilities (excluding reactors). The categories of facilities are covered and a summary of the waste volumes and activities associated with D & D are listed. Lists of the individual facilities are summarized. Both active and inactive facilities are covered, but the only inactive facilities included are inactive mines. The largest volumes of wastes are associated with uranium mines. The greatest amount of activity - about 2 million curies - and the highest specific activities are associated with the wastes from fuel reprocessing. The most common contaminant at fuel cycle facilities is uranium. The activity and volume estimates for D & D wastes from many of the facilities assume that most of the decontamination solutions and materials are processed through the normal plant system to recover the uranium and reduce the volume.

53633 (CONF-821005—, pp VII.169-VII.184) **Decommissioning of independent spent fuel storage installations.** Ludwick, J.D.; Moore, E.B. (Pacific Northwest Lab., Richland, WA). 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

Safety and cost information is developed for the conceptual decommissioning of five different types of independent spent fuel storage installations (ISFSIs), each of which is being given consideration for long-term storage of spent nuclear fuel in the United States. These include one water basin-type ISFSI (wet) and four dry ISFSIs (drywell, silo, vault, and cask). Three decommissioning alternatives are studied to obtain comparisons between costs (in 1981 dollars), occupational radiation doses, and potential radiation doses to the public. The alternatives considered are: DECON (immediate decontamination), SAFSTOR (safe storage followed by deferred decontamination, and ENTOMB (entombment). The effects

of storage size, colocation at a reactor site and elimination of fuel encapsulation upon decontamination are examined to provide potential owners with information applicable to most proposed ISFSIs. 6 tables.

53634 (CONF-821005—, pp VII.185-VII.191) **Evaluation of nuclear facility decommissioning projects program.** Miller, R.L. (UNC Nuclear Industries, Richland, WA). 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

Major studies have been undertaken in recent years by the US Nuclear Regulatory Commission (NRC) and others on the technology, safety, and costs associated with decommissioning nuclear facilities. The program described in this presentation is being undertaken by the NRC to compile and evaluate the activities of ongoing decommissioning projects. Assessment and evaluation of the methods, impacts, and costs will provide bases for evaluating licensee's decommissioning proposals and for future decommissioning direction and regulation. Program participants include the US Nuclear Regulatory Commission (NRC) through the Office of Regulatory Research, UNC Nuclear Industries (UNC) through the Office of Surplus Facilities Management, and nuclear facility licensees. The evaluation of Nuclear Facility Decomissioning Projects Program has been separated into the following tasks: (1) program management; (2) identification of facilities; (3) collection of data; (4) analysis and reporting of field data; and (5) summary comparisons and evaluations. This computer program incorporates information related to the following: (1) facility classification, including design, configuration, construction, operator, and operating history; (2) predecommissioning engineering; (3) predecommissioning radionuclide inventory and dose assessment; (4) ALARA efforts; (5) waste disposition, for both contaminated and noncontaminated materials, including packaging, transportation, and disposal site; (6) decommissioning technology with data to be accumulated on costs, radiation exposure, standard and special techniques, special tooling, evaluation of decontamination efforts, and termination survey data; and (7) lessons learned.

53635 (CONF-821005—, pp VII.214-VII.226) **Decommissioning engineering within the framework of the French nuclear structure.** Rodrigues, S. (Technicatome, Saclay, France). 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

The engineering studies leading to the preparation of the technical construction docket are performed by expertised and specialized teams. It is advisable that the operating staff of the concerned facility might closely participate in the engineering studies and assist the specialized engineering team, as it is well acquainted with the facility to be dismantled. The technical file specifies: (1) the techniques to be implemented ensuring their mutual compatibility; (2) the strict organization of operations from the standpoint of feasibility and schedule; (3) the allocation of work segments of such operations; (4) the works supply contracts and limits of liability of the contractors involved; and (5) the required equipment procurements (e.g. robots). The engineering studies are further used for the construction studies to be completed by the selected contractors. 1 reference, 2 figures, 1 table.

53636 (CONF-830528—Summ., pp IV.3-IV.4) **Module container system for LAW disposal.** Viecenz, H.J.; Krieger, F. (Gg. NOELL GmbH, Wuerzburg, Germany). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53637 (CONF-830528—Summ., pp IV.5-IV.6) **Low-cost/high-capacity waste casks: the MOSAIK family.** Rittscher, D. (Gesellschaft fuer Nuklear-Service mbH, Essen, Germany); Schilling, H.; Glaser, H.; Dybeck, P. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53638 (CONF-830528—Summ., pp D.I.11-D.I.12) **Isotopic analysis of radioactive waste packages (an inexpensive approach).** Padula, D.A.; Richmond, J.S. (Wisconsin Public Service Corp., Kewaunee). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53639 (CONF-830528—Summ., pp D.I.13-D.I.14) **Development of waste package designs for disposal in a salt repository.** Balmert, M.E. (Battelle Project Management Division, Columbus, OH). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53640 (CONF-830528—Summ., pp VII.9-VII.10) **Radwaste receiving and handling facilities for mine disposal.** Viecenz, H.J.; Krieger, F. (Gg. NOELL GmbH, Wuerzburg, Germany). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53641 (CONF-830528—Summ., pp XIX.11-XIX.12) **Impacts of transportation on a test and evaluation facility for nuclear waste disposal: a systems analysis.** Varadarajan, R.V. (Battelle Memorial Inst., Columbus, OH); Peterson, R.W.; Joy, D.S.; Gibson, S.M. 1983. NTIS, PC A21/MF A01. Contract AC06-76RL01830;W-7405-ENG-26.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53642 (CONF-8308106—4) **Shallow land burial handbook.** Stinton, L.H. (Oak Ridge National Lab., TN (USA)). 1983. Contract W-7405-ENG-26. 7p. NTIS, PC A02/MF A01. Order Number DE83017192.

From 5th. annual participants information meeting of DOE low level waste management program; Denver, CO, USA (30 Aug 1983).

The facility development phases (preliminary analysis, site selection, facility design and construction, facility operation, and facility closure/post-closure) are systematically integrated into a logical plan for developing near surface disposal plans. The Shallow Land Burial Handbook provides initial guidance and concepts for understanding the magnitude and the complexity of developing new low-level radioactive waste disposal facilities.

53643 (DOE/EP—0100) **Guide for radiological characterization and measurements for decommissioning of US Department of Energy surplus facilities.** Denahm, D.H.; Barnes, M.G.; Jaquish, R.E.; Corley, J.P.; Gilbert, R.O.; Hoenes, G.R.; Jamison, J.D.; McMurray, B.J.; Watson, E.C. (Battelle Pacific Northwest Labs., Richland, WA (USA)). Aug 1983. Contract AC06-76RL01830. 226p. NTIS, PC A11/MF A01. Order Number DE83017542.

This Guide describes the elements of radiological characterization at DOE excess facilities in preparation for, during, and subsequent to decommissioning operations. It is the intent of this Guide and accompanying appendices to provide the reader (user) with sufficient information to carry out that task with a minimum of confusion and to provide a uniform basis for evaluating site conditions and verifying that decommissioning operations are conducted according to a specific plan. Some areas of particular interest in this Guide are: the need to involve appropriate staff from the affected states in the early planning stages of decommissioning; the need for and suggested methods of radiological site characterization to complete a decommissioning project, including: historical surveys, environmental pathway analyses, statistical sampling design, and choosing appropriate instrumentation and measurements; the need for and emphasis on quality assurance, documentation and records retention; the establishment of a Design Objective approach to applying site-specific contamination limits based on the ALARA philosophy; the establishment of a "de minimis" or minimum dose

level of concern for decommissioning operations based on existing standards, experience and ALARA considerations.

53644 **(DOE/ID/12371—4) Feasibility of co-disposing low-level radioactive waste with uranium mill tailings and/or FUSRAP waste.** Whitman, M. (Colorado Office of the Governor, Denver (USA)). Sep 1983. Contract FG07-82ID12371. 26p. NTIS, PC A03/MF A01. Order Number DE83017786.

Analysis of the two most critical factors affecting a co-facility, economics and technical feasibility, indicates that neither should pose significant problems and in fact many aspects, particularly in economics, favor a co-facility over specialized disposal facilities. In consideration of costs, the symbiotic nature of co-facility economics should be recognized by the different parties the co-facility would serve. By minimizing the cost burdens of the LLW/UMTRAP disposal site users, a co-facility offers a unique opportunity for the cooperative subsidization of commercial and governmental operations. Likewise, a LLW/active tailings disposal co-facility affords two different sets of commercial users the opportunity to maximize the economic efficiency of each other's disposal operations. The technical requirements for siting a LLW or uranium mill tailings disposal facility are so similar as to appear tailor-made for a co-facility. Where differences are necessary, such as to distinguish between pollution sources in environmental monitoring, LLW and mill tailings are different. Where similarities are useful, such as in siting criteria and disposal operations, LLW and mill tailings are nearly identical. Institutional factors are split in their adaptability to a co-facility. Although public perceptions will range to both extremes, the fact that a significant percentage of the local populace may favor a co-facility serves as added incentive for such an operation. The institutional aspects which could serve as considerable impediments to co-facility development would be concern about liability in the event of site failure and licensing and legal obstacles associated with UMTRAP disposal that did not meet active tailings disposal licensing requirements.

53645 **(DOE/NBM—3018226) Petrographic examination of Bell Canyon Tests (BCT) 1-FF field grouts over a three-year period.** Burkes, J.P.; Rhoderick, J.E. (Army Engineer Waterways Experiment Station, Vicksburg, MS (USA). Structures Lab.). Aug 1983. Contract FG97-80ET46630. 40p. NTIS, PC A03/MF A01. Order Number DE83018226.

The Bell Canyon field test involving the placement of two grout plugs took place 26 September 1979 (Plug 1) and 14 February 1980 (Plug 2). Samples cast in the field were brought to WES and cured in hole AEC-7 (lease) brine. Samples were examined periodically through 1 year and then at 2- and 3-years age to obtain petrographic, physical, and some chemical data. This report deals solely with the petrographic data. Cracking was believed to be due largely to moisture and temperature changes in the laboratory. The two plugs were similar in composition with the Plug 1 grout having more tetracalcium aluminate monosulfate-12-hydrate and more garnet-hydrogarnet solid solution series material (hydrogarnet) by x-ray diffraction (XRD) than Plug 2. Tetracalcium aluminate dichloride-10-hydrate was present in both samples in varying amounts at different ages. Plug 2 grout contained more ettringite and calcium hydroxide; Plug 1 grout contained more detectable calcium silicate hydrate. The grout to host anhydrite rock bond appeared to be tight with no visible cracking in simulated borehole samples that were examined immediately after fracturing. A white precipitate found on samples of both events during storage and is believed to be a combination of some chemical reaction between the groundwater and grout as well as precipitate from the brine. It had no detectable detrimental effects. Infiltration of the brine during placement of the grout in satellite Holes 3 and 4 weakened the grout and retarded some of the grout so that it did not harden. XRD examinations of both Plug 1 and Plug 2 grouts point out that chloride and carbonate ions from the brine are causing some alteration to the original phases at and near the contact of grout and brine. After 3 years of storage, this alteration has penetrated the grout to a depth of about 1 or 1.5 in. with the severity of alteration becoming less with increasing distance from contact surfaces.

53646 **(ENICO—1116-8-83) ICPP 1st-quarter 1983 effluent-monitoring report. Supplement 1.** (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). Aug 1983. Contract AC07-79ID01675. 58p. NTIS, PC A04/MF A01. Order Number DE83016453.

Portions are illegible in microfiche products.

This report summarizes the data collected for effluent and environmental monitoring programs conducted at ICPP from December 20, 1982 through March 19, 1983. Through the first quarter of 1983, 196.5 curies of activity have been disposed of from ICPP operations. Airborne effluent releases to the atmosphere contributed 113 curies; liquid effluent releases through the disposal well contributed 52.9 curies; and solid waste shipped to the Radioactive Waste Management Complex (RWMC) contained 30.6 curies. In all cases, the activity released to date was below the forecasts. The volume of solid waste shipped exceeded the forecasts because the wastes built up over a period of time and then were shipped in the first quarter.

53647 **(ENICO—1134) Determination of low specific activity iodine-129 off-gas concentrations by GC separation and negative ionization mass spectrometry.** Fernandez, S.J.; Rankin, R.A.; McManus, G.J.; Nielsen, R.A.; Delmore, J.E.; Hohorst, F.A.; Murphy, L.P. (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). Sep 1983. Contract AC07-79ID01675. 45p. NTIS, PC A03/MF A01. Order Number DE83017993.

This document is the final report of the laboratory development of a method for determining the specific activity of the ^{129}I emitted from a nuclear fuel reprocessing plant. The technique includes cryogenic sample collection, chemical form separation, quantitation by gas chromatography, and specific activity measurement of each chemical species by negative ionization mass spectrometry. The major conclusions were that both organic and elemental iodine can be quantitatively collected without fractionation and that specific activity measurements as low as one atom of ^{129}I per 10^5 atoms of ^{127}I are possible.

53648 **(ENICO—1136) Determination of baseline levels of toxic nonradioactive substances at the ICPP.** Burr, J.R.; McManus, G.J.; Hohorst, F.A.; Duce, F.A.; Peterson, G.L.; Fernandez, S.J. (Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)). Sep 1983. Contract AC07-79ID01675. 32p. NTIS, PC A03/MF A01. Order Number DE83018070.

This report documents the concentrations of nonradioactive hazardous materials in off-gas, precipitation, and soil at the Idaho Chemical Processing Plant (ICPP). Also, methods of collection and analysis were evaluated for boron, cadmium, fluoride, and mercury in ICPP off-gas and for mercury and cadmium in ICPP soil. ICPP stack release rates for B, Cd, F^-, and Hg were 2 +- 0.7, $\leq$ 8, $\leq$ 1.6, and $\leq$ 50 g/day, respectively. Analyses of ICPP precipitation showed Hg and Cd concentrations of $\leq$ 0.07 ngHg/mL and $\leq$ 100 ng Cd/mL. ICPP soil had an average of 31 ppB Hg and $<$ 4 ppM Cd. None of these levels pose a significant environmental concern.

53649 **(LBL—16045) Geochemical assessment of nuclear waste isolation. Report of activities during fiscal year 1982.** (Lawrence Berkeley Lab., CA (USA)). Jul 1983. Contract AC03-76SF00098. 224p. NTIS, PC A10/MF A01. Order Number DE83017903.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The status of the following investigations is reported: canister/overpack-backfill chemical interactions and mechanisms; backfill and near-field host rock chemical interactions mechanisms; far-field host rock geochemical interactions; verification and improvement of predictive algorithms for radionuclide migration; and geologic systems as analogues for long-term radioactive waste isolation.

53650 **(MLM—3074(OP)) Evaluation of a processing technique for immobilization of low-level waste.** Armstrong, K.M. (Monsanto Research Corp., Miamisburg, OH (USA). Mound). 1983. Contract AC04-76DP00053. 7p. (CONF-8308106—3). NTIS, PC A02/MF A01. Order Number DE83016628.

From 5th. annual participants information meeting of DOE low level waste management program; Denver, CO, USA (30 Aug 1983).

A commercially available joule-heated glass furnace system is currently being evaluated at Mound as a means of processing low-level radioactive wastes typically found in light water reactor facilities. This evaluation has been primarily concerned with determining the effectiveness of the processing technique in the areas of volume reduction and immobilization. The first phase of the evaluation consisted of a series of nonradioactive experiments to determine the combustion efficiency of the furnace and chemical durability of the glass for several waste types deemed representative of power plant effluent streams. Upon completion of this work, radioactive spiked experiments were initiated which will provide, when completed, a comprehensive mass balance and establish volatility trends for several predominant radioisotopes.

53651 **(MLM—3094(OP)) Cyclone incinerator: operating experience.** Klingler, L.M. (Monsanto Research Corp., Miamisburg, OH (USA). Mound). 1983. Contract AC04-76DP00053. 8p. (CONF-8308106—2). NTIS, PC A02/MF A01. Order Number DE83016988.

From 5th. annual participants information meeting of DOE low level waste management program; Denver, CO, USA (30 Aug 1983).

The cyclone incinerator, developed at Mound in the mid to late 1970's, has proven to be a valuable tool for the volume reduction of the plant's combustible radioactive wastes. The incinerator has affected a significant reduction in Mound's offsite waste shipping requirements. More than 27 tons of plutonium-contaminated wastes have been incinerated in the system at volume reduction factors of greater than 95%. Moreover, the extreme simplicity of the system in principle, design, components, and operation has resulted in extremely low maintenance cost and real plant cost savings in waste handling and disposal over the past several years. The cyclone incinerator has more potential plant users than available operating time. In addition to burning dry solids, incineration feasibility has been demonstrated for wastes presenting special disposal problems to the plant. These wastes include combustible liquids, scintillation vials, and tritium contaminated dry solid wastes.

53652 **(NUREG/CR—2482-Vol.4) Review of DOE waste package program. Subtask 1.1. National waste package program, October 1982-March 1983. Vol. 4.** Soo, P. (ed.). (Brookhaven National Lab., Upton, NY (USA)). Sep 1983. Contract AC02-76CH00016. 180p. (BNL-NUREG—51494-Vol.4). NTIS, PC A09/MF A01 - GPO $6.00. Order Number DE83018273.

Portions are illegible in microfiche products.

The current effort is part of an ongoing task to review the national high-level waste package effort. It includes evaluations of reference waste form, container, and packing material components with respect to determining how they may contribute to the containment and controlled release of radionuclides after waste packages have been emplaced in salt, basalt, and tuff repositories. In the current Biannual Report a section on tuff repository conditions has been included to complement prior work for salt and basalt. Failure/degradation modes for borosilicate glass waste forms, carbon steel containers, and bentonite-based and zeolite-based packing materials (discrete backfills) have been reviewed and the licensing data requirements to demonstrate the degree of compliance with NRC performance objectives specified.

53653 **(NUREG/CR—3091-Vol.2) Review of waste package verification tests. Semiannual report, October 1982-March 1983.** Soo, P. (ed.). (Brookhaven National Lab., Upton, NY (USA)). Aug 1983. Contract AC02-76CH00016. 129p. (BNL-NUREG—51630-Vol.2). NTIS, PC A07/MF A01 - GPO $5.00. Order Number DE83017468.

The current study is part of an ongoing task to specify tests that may be used to verify that engineered waste package/repository systems comply with NRC radionuclide containment and controlled release performance objectives. Work covered in this report analyzes verification tests for borosilicate glass waste forms and bentonite- and zeolite-based packing materials (discrete backfills). 76 references.

53654 **(NUREG/CR—3204) Consolidation of tailings.** Nelson, J.D.; Wardwell, R.E.; Abt, S.R.; Staub, W.P. (Oak Ridge National Lab., TN (USA)). Sep 1983. Contract W-7405-ENG-26. 35p. (ORNL/TM—8690). NTIS, PC A03/MF A01 - GPO. Order Number DE83018197.

The integrity of cover systems placed on tailings impoundments will be affected by the potential for differential settlement of the tailings surface. Settlement of the sand fraction will occur relatively rapidly. The slimes will take longer time for consolidation and will produce greater settlement. This report reviews the phenomenon of consolidation for saturated and unsaturated tailings. The effect of load application by cover placement and the extent to which dewatering of tailings will cause consolidation are considered. In addition, the feasibility of inducing consolidation by alternative means and the potential applicability of these methods to tailings impoundments reclamation are discussed. Differential settlement of the tailings will cause tensile strain to be developed in covers. This strain could be large enough to cause cracking within a relatively brittle compacted clay. Dewatering of tailings by drainage can cause settlement even greater than that by placement of a cover material. Dewatering of the tailings would also increase the stability of the tailings surface, thereby enhancing reclamation operations. Consequently, in view of the enhanced surface stability and the fact that a portion of the differential settlement can be accomplished prior to cover placement, dewatering of tailings impoundments during operations may have benefical effects.

53655 **(NUREG/CR—3397) Design considerations for long-term stabilization of uranium mill tailings impoundments.** Nelson, J.D.; Volpe, R.L.; Wardwell, R.E.; Schumm, S.A.; Staub, W.P. (Oak Ridge National Lab., TN (USA)). Sep 1983. Contract W-7405-ENG-26. 163p. (ORNL—5979). NTIS, PC A08/MF A01 - GPO. Order Number DE83018208.

Portions are illegible in microfiche products.

This report discusses the factors affecting the design of a reclamation scheme for long-term stability of uranium mill tailings impoundments. An initial design stability period of 200 years is addressed, and the incremental effort required to extend this design stability period to 500 and 1000 years is investigated. The report considers the hydrologic, geomorphic, and geotechnical engineering aspects of long-term stability.

53656 **(NUREG/CR—3427-Vol.1) Long-term performance of materials used for high-level waste packaging. Quarterly report, April-June 1983.** Stahl, D.; Miller, N.E. (comps.). (Battelle Columbus Labs., OH (USA)). Aug 1983. 54p. NTIS, PC A04/MF A01 - GPO $4.25. Order Number DE83910816.

The Nuclear Regulatory Commission is responsible for the licensing of deep-mined geologic repositories for high-level radioactive waste disposal. The NRC's Office of Nuclear Regulatory Research is developing the technical capability to assess the Department of Energy's compliance with applicable regulations. As part of the NRC's effort, Battelle's Columbus Laboratories is investigating the long-term performance of materials used for high-level waste packages. The experimental program for investigating waste form degradation is in preparation, and the mathematical description of waste glass dissolution has been refined. Groundwater corrosion studies have been nearly completed for titanium and are under way for steel container materials. Internal glass-stainless steel corrosion tests have been initiated and pitting chemical interactions are being evaluated. A first-cut physical description of general corrosion of container materials in contact with groundwaters is near completion. An improved description of fluid flow through a nuclear waste package was developed, along with a comprehensive method for tracking release of specific radioisotopes. Efforts continue in water-chemistry studies, accelerated testing, and procedure development. This report documents investigations performed during April-June, 1983. 7 references.

53657 **(NUREG/CR—3473) Rock mass sealing: experimental assessment of borehole plug performance. Annual report, June 1982-May 1983.** Daemen, J.J.K.; Stormont, J.C.; Colburn, N.I.; South, D.L.; Dischler, S.A.; Fuenkajorn, K.; Greer, W.B.; Adisoma, G.S.; Miles, D.E.; Kousari, B. (Arizona Univ., Tucson (USA). Dept. of Mining and Geological Engineering). Sep 1983. 301p. NTIS, PC A14/MF A01 - GPO $7.50. Order Number DE83910814.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This report summarizes rock mass sealing work, primarily experimental borehole plugging performance assessments, completed, started, or planned during the period June 1, 1982-May 31, 1983. Flow testing of confined and unconfined cylindrical samples of granite, basalt, and tuff with cement and bentonite plugs in coaxial demonstrates that hole sealing is possible (under laboratory and short-term conditions), to a quality where neither plug nor plug-rock interface form preferential flowpaths. Cement plugs in basalt and granite have sufficient interface strength to make axial failure improbable at expected repository loading. Both flow and strength are impaired significantly and rapidly when plugs dry. Partial performance recovery occurs upon resaturation. Cement plug interface strength is erratic, making extrapolations to larger diameters or lengths difficult. A cement plug has been installed in a borehole running between two mine drifts. Plug testing is in progress. Field work, instrumentation and design are completed for in-situ testing of plugs in basalt (McNary damsite, Washington). Static laboratory testing of cement plugs in granite, a reference basis for planned dynamic testing, is complete. Dynamic testing equipment has been assembled. Studies of damage induced by drilling in the walls of holes in basalt have started. Equipment for studying the influence of in-situ ambient rock temperatures on plug performance is being assembled. An assessment is given of rock mass features and construction procedures that might influence sealing of larger size excavations.

53658 **(ONWI—92) Overview of the regional geology of the Paradox Basin Study Region.** (Woodward-Clyde Associates, San Francisco, CA (USA)). Mar 1983. Contract AC06-76RL01830. 443p. NTIS, PC A19/MF A01. Order Number DE84000508.

Portions are illegible in microfiche products.

The Geologic Project Manager for the Paradox Basin Salt Region (PBSR), Woodward-Clyde Consultants, has conducted geologic studies to characterize the region and evaluate selected geologic formations as potential repositories for the storage and disposal of nuclear waste. Evaluations have been made from the standpoint of engineering feasibility, safety, public health, and resource conflicts. The Regulatory Project Manager for the PBSR, Bechtel National, Inc., has performed environmental characterizations to ensure that data on ecological, socioeconomic, and other environmental factors required by the National Environmental Policy Act of 1969 are considered. This report characterizes, at a regional overview level of detail, the Paradox Basin Study Region Geology. Information sources include the published literature, field trip guidebooks, open file data of the US Geological Survey (USGC) and Utah Geologic and Mineral Survey, university theses, Geo-Ref Computer Search, and various unpublished sources of subsurface data such as well logs. Existing information has been synthesized and characterized. No field work was conducted as part of this study. Where possible, attempts were made to evaluate the data. All results of this study are subject to change as more data become available.

53659 **(ONWI—195) Two-dimensional analysis of joint and fault plane stability around a radioactive waste repository in bedded salt.** (Minnesota Univ., Minneapolis (USA)). Oct 1980. Contract AC06-76RL01830;AC02-83CH10140. 91p. NTIS (US Sales Only), PC A05/MF A01. Order Number DE84000509.

Portions are illegible in microfiche products.

Program SALTY, a computer model for simulating the behavior of geologic discontinuities in the rock mass surrounding a nuclear waste repository in bedded salt is described. The rock mass is assumed to be isotropic and linearly elastic. All time-dependent effects are confined to a single seam along which mining takes place. The computer model is based on the displacement discontinuity method, in which the seam is treated as a number of individual displacement discontinuities, or dislocations, whose values are determined such that the appropriate boundary conditions are satisfied at each element. The boundary conditions are governed by the overburden stress, the thermal stress and the induced stress due to mining. The radioactive waste is modelled as a series of line heat sources with a specified exponential decay rate. The creep deformation of the seam is computed from a creep law whose form was derived from laboratory model pillar tests; the parameters for the creep law were derived from full scale field data obtained from the Project Salt Vault experiment. Rock discontinuities, such as faults and joints, are each modelled as a line of elements whose shear stress cannot exceed the value specified by the Mohr-Coulomb failure condition. If the failure condition is reached, the element is allowed to slip. A series of checkout runs was performed to confirm that the program was functioning properly, and to investigate the sensitivity of the model to reasonable variations of particular parameters. The effect of a wide barrier pillar, and the stability of joints were investigated. These examples serve to demonstrate that program SALTY could be a useful tool for repository design.

53660 **(ONWI—197) Preliminary investigation of the structural influence of entry-entry intersections and inhomogeneous initial-stress fields on repository disposal rooms.** Loken, M.C. (RE/SPEC, Inc., Rapid City, SD (USA)). Jul 1983. Contract AC06-76RL01830;AC02-83CH10140. 57p. NTIS, PC A04/MF A01. Order Number DE83018071.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The structural influence of entry-entry intersections and inhomogeneous initial stress fields on a repository configuration has been investigated. The out-of-plane stress increases rapidly into the pillar from the rib of the connecting corridor to the plane strain value within one pillar width of the intersection, indicating that a two-dimensional analysis is valid over a major portion of the disposal room and pillar. Inhomogeneous initial stress fields do not significantly alter the trends of the resulting post-excavation stress fields. However, the magnitude of the vertical stress and the effective stress is slightly greater near the corner at the intersection. Further nonlinear analyses are required to assess the stability of the pillar at the intersection because of the high deviatoric stresses occurring in that region. 6 references.

53661 **(ONWI—284) Seismic evaluation of headframe and associated equipment.** (Engineering Decision Analysis Co., Inc., Palo Alto, CA (USA)). Nov 1982. Contract AC06-76RL01830. 226p. NTIS, PC A11/MF A01. Order Number DE83018267.

Portions are illegible in microfiche products.

This report presents the results of studies on the seismic evaluation of the headframe structure and the associated equipment for the Canistered Waste Facility of a Nuclear Waste Storage Repository. The conceptual design for the repository was developed by Stearns-Roger Engineering Corporation. The studies described in this report were performed by Engineering Decision Analysis Company, Inc. (EDAC) for Battelle/Office of Nuclear Waste Isolation (ONWI). The evaluations included the following main tasks: Task I. Development of seismic input; Task II. Seismic evaluation of headframe; Task III. Seismic evaluation of the cable/hoist system; Task IV. Cask drop evaluation; Task V. Quality assurance analysis. Because some components in the system could not withstand the postulated seismic motions without failure or without exceeding specified factors of safety, it was recommended that complete and detailed seismic criteria should be developed for the seismic input motions and the design of the headframe structure and associated equipment, such as the cable/hoist system. The analyses performed in this study and the resulting understanding developed of the behavior of the headframe structure and the cable/hoist system will be extremely helpful in the development of such criteria. A description of the computer programs used in this study is presented in Appendix A.

53662 **(ONWI—363) Preliminary assessment of the healing of fractures in salt.** (Stone and Webster Engineering Corp., New York (USA)). Jul 1983. Contract AC06-76RL01830;AC02-83CH10140. 32p. NTIS, PC A03/MF A01. Order Number DE83018265.

Natural fractures in salt are not common but have been observed. An assessment is made of whether and under what conditions such fractures regain cohesion (heal). Evidence comes from observations in mines, commercial processing, and laboratory testing of both fractured and granular salt. Healing can take the form of chemical precipitation, ductile injection, and creep closure. Of these, creep closure is of principal interest. Healing is measured in terms of recovered strength and reduced permeability. It is found to increase with increased confining pressure and is greatly enhanced when the salt is in contact with brine. Research at Sandia National Laboratories has demonstrated salt fracture healing in relatively short time periods under conditions consistent with the environment of a geologic repository. 45 references.

53663 **(ONWI—365) Petrographic and geochemical characteristics of the Cypress Creek salt core.** (Law Engineering Testing Co., Atlanta, GA (USA)). Jul 1983. Contract AC06-76RL01830. 103p. NTIS MF A01. Order Number DE83017860.

Microfiche only, copy does not permit paper copy reproduction. Original copy available until stock is exhausted.

Law Engineering Testing Company supervised the drilling of a corehole into the stock of Cypress Creek Dome, located in Perry County, Mississippi. A total of 170 ft of caprock and 501 ft of salt stock was recovered for physical examination and chemical analysis. This report describes the types of analyses performed and summarizes the data developed. The entire caprock and salt core were described and photographed prior to selection of samples for petrologic and geochemical analysis. Transmitted light techniques were used to determine gross structural and compositional variations in the core. The core lithologies are presented graphically, at a scale of 1 in. to 2 ft. In addition to the detailed field descriptions and photographs, petrologic studies performed on selected caprock and salt samples included: thin-section examination, scanning-electron microscope studies, energy-dispersion analysis, and x-ray-diffraction analysis. Geochemical analyses were performed to determine the average elemental composition of the salt core and amounts of methane and carbon dioxide gases contained within the salt grains. Except for two thin (3 and 6 ft thick) gypsum zones in the top 27 ft of the caprock, the core is predominantly anhydrite (generally 80%). Minor amounts of dolomite and calcite are also present. The salt core consists predominantly of crystalline halite, fine- to medium-grained (0.25 to 1 in.) with few megacrysts. Anhydrite occurs in the salt core as disseminated grains, ranging in length from <0.1 in. to 12 in. Discrete zones exist within the salt core, distinguished from one another primarily by the character of the anhydrite inclusions.

53664 **(ONWI—417) Topical reports on Louisiana salt domes.** (Louisiana State Univ., Baton Rouge (USA). Inst. for Environmental Studies). Sep 1983. Contract AC06-76RL01830;AC02-83CH10140. 128p. NTIS, PC A07/MF A01. Order Number DE83017789.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The Institute for Environmental Studies at Louisiana State University conducted research into the potential use of Louisiana salt domes for disposal of nuclear waste material. Topical reports generated in 1981 and 1982 related to Vacherie and Rayburn's domes are compiled and presented, which address palynological studies, tiltmeter monitoring, precise releveling, saline springs, and surface hydrology. The latter two are basically a compilation of references related to these topics. Individual reports are abstracted.

53665 (ONWI—417, pp 5-58) **Palynological studies Vacherie and Rayburn's domes North Louisiana salt dome basin.** Kolb, C.R.; Fredlund, G.G. Sep 1983. NTIS, PC A07/MF A01.

In Topical reports on Louisiana salt domes.

A problem associated with the interpretation of the Quaternary deposits over Vacherie and Rayburn's domes is that, in each instance, known Quaternary sediments characterized by coarse sands and chert gravels are underlain by sediments whose age is uncertain. In the case of Vacherie dome, the sediments consist of fine sands with small amounts of silts and clays (anomalous sands). At Rayburn's, a stratum containing calcite boulders and cobbles overlies anhydrite caprock. An objective of the palynological studies reported here was to generate data that would help in determining the age of these two units. A literature search established diagnostic palynological trends within the Tertiary and Quaternary of the Gulf Coast. Diagnostic trends of known geologic age from the study area were determined. Pollen assemblages were extracted from samples derived from cored and calyx borings above both domes using standard palynological extraction methods with some slight modifications. Results of the examination of pollen suites at Vacherie suggest the anomalous sands can range from Miocene (20 million years) to Quaternary in age. Prior to these studies, the age of these sands could only be postulated as ranging from early Tertiary (65 million years) to Quaternary. Pollen assemblages present in the boulder zone at Rayburn's indicate an age range from Oligocene (30 million years) to late Pliocene. More important, pollen from the known Quaternary at Rayburn's proved useful in differentiating glacial from interglacial deposits. Rates of dissolution of the salt and resultant subsidence of very recent Quaternary deposits, dated by ^{14}C methods, were calculated to be one foot per thousand years during the last 15,000 years. 25 references.

53666 (ONWI—417, pp 59-86) **Analysis of tiltmeter monitoring of Northern Louisiana salt domes.** Waldon, M.G.; Thoms, R.L. Sep 1983. NTIS, PC A07/MF A01.

In Topical reports on Louisiana salt domes.

Data were recorded at several tiltmeter sites in Northern Louisiana in the vicinity of Vacherie and Rayburn's salt domes. The objective of this data recording and subsequent analysis was to determine, if possible, the present rate of dome vertical movement, or to attempt to establish an upper bound to movement if undetectably small. Biaxial tiltmeters utilized were calibrated to detect extremely small tilts about two principal axes. No statistically significant tilting was observed during this survey. 13 references.

53667 (ONWI—417, pp 87-110) **Precise leveling, Vacherie salt dome, Webster and Bienville Parishes, Louisiana.** Thoms, R.L.; Gehle, R.M. Sep 1983. NTIS, PC A07/MF A01.

In Topical reports on Louisiana salt domes.

Salt stock stability of salt domes is a major consideration in the characterization of domes for potential nuclear waste disposal sites. Halokinetic salt movement has been confused with tectonic movement, although tectonism has played little, if any, role in the evolution of salt domes. Releveling of the ground surface overlying a salt dome allows a determination of possible surface effects which may be associated with vertical movement, either upward movement of the salt stock or relative downward movement of the overlying sediment due to salt dissolution. 10 references.

53668 (ONWI—417, pp 111-120) **Saline spring study.** Kumar, M.B. Sep 1983. NTIS, PC A07/MF A01.

In Topical reports on Louisiana salt domes.

A compilation of 82 references related to saline springs is presented.

53669 (ONWI—417, pp 121-128) **Surface hydrology study.** Kumar, M.B. Sep 1983. NTIS, PC A07/MF A01.

In Topical reports on Louisiana salt domes.

A compilation of 45 references related to surface hydrology is presented.

53670 **(ONWI—474) Durability of marker materials for nuclear waste isolation sites.** Berry, W.E. (Battelle Columbus Labs., OH (USA)). Aug 1983. Contract AC06-76RL01830;AC02-83CH10140. 62p. NTIS, PC A04/MF A01. Order Number DE83018230.

The Department of Energy's Office of Nuclear Waste Isolation is examining all aspects of establishing an underground repository for the disposal of nuclear wastes. The Human Interference Task Force (HITF) has been created to investigate the problems

connected to the closure and final marking of a filled repository. The task of the HITF is to devise a method of warning future generations, who may or may not have records of the repository's contents, not to mine or drill at that site unless they are aware of the consequences of their actions. Since the likelihood of human interference should be minimized for up to several thousand years, a durable marker system must be devised. Accordingly, this paper reviews the probable long-term performance of materials that might be used for nuclear waste isolation sites. 58 references.

53671 **(ONWI—478) Potentiometric-level monitoring program - Mississippi and Louisiana: annual status report for Fiscal Year 1982.** (ERTEC, Inc., Long Beach, CA (USA)). Jun 1983. Contract AC06-76RL01830;AC02-83CH10140. 121p. NTIS, PC A06/MF A01. Order Number DE83014558.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Ertec, Inc. is conducting a potentiometric monitoring program in Mississippi and Louisiana for the Office of Nuclear Waste Isolation (ONWI) as part of the Regional Ground-Water Flow Activities for Richton and Vacherie domes. Ertec, Inc. assumed responsibility for this program from Law Engineering Company (LETCo) in February 1982. The results of Ertec's monitoring program have been periodically submitted to ONWI in two quarterly reports. This annual report contains monitoring data obtained during the 1982 Fiscal year, together with: a review of actions taken to ensure the quality of the monitoring program following the assumption of the monitoring program from LETCo, a summary of the problems encountered during the monitoring program, and recommendations for the monitoring program in the future.

53672 **(ONWI—486) Evaluation of clays and clay minerals for application to repository sealing.** Meyer, D.; Howard, J.J. (eds.). (D'Appolonia Consulting Engineers, Inc., Pittsburgh, PA (USA); Pennsylvania State Univ., University Park (USA)). Jul 1983. Contract AC06-76RL01830;AC02-83CH10140. 189p. NTIS, PC A09/MF A01. Order Number DE83017788.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Clays are promising candidate materials for use in sealing nuclear waste repositories. Clay seals can be constructed with internal hydraulic conductivities lower than 10^{-9} cm/sec, approaching conductivities of candidate repository host rocks. Other favorable properties of clays include high sorptivity, high compressibility, and in some cases, high swelling capacity. Although not all clay stability issues are resolved, the potential of clays and clay minerals for long-term sealing is inferred from their geologic persistence, their low solubility in repository-like environments and their slow reaction kinetics. Moreover, expectations of long-term seal performance can be enhanced by prudent selection of clay mineralogy, clay content, moisture content, and emplacement technique. Techniques for emplacing clay-rich barriers include in-place compaction, emplacement in precompacted form, and slurry injection. Technologies for most of these techniques already exist. The sorptivity of clays with respect to radionuclides may be closely related to the cation exchange capacity of the constituent clay minerals. The sorptive capacity of a material may be gauged also by reference to a sorption coefficient. Laboratory studies have shown clays to be efficient sorbers of selected radionuclides although performance depends on radionuclide concentration, temperature, Eh, pH, fluid composition, and clay mineralogy. High priority research items include: (1) thermodynamic properties of clays, and their thermal stabilities and phase transformations, bearing on longevity; (2) seal-rock interface permeability, and permeability at extended times and elevated temperatures, bearing on performance of clay as a barrier to ground water movement; and (3) sorptivity under realistic repository conditions, bearing on performance as a chemical barrier. 139 references.

53673 **(ONWI—494) Performance assessment of a shaft seals system in a HLW repository in the Gibson Dome area.** Gureghian, A.B.; Scott, L.A.; Raines, G.E. (Battelle Memorial Inst., Columbus, OH (USA). Office of Nuclear Waste Isolation). Aug 1983. Contract AC02-83CH10140;AC06-76RL01830. 98p. NTIS, PC A05/MF A01. Order Number DE84000527.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The performance assessment of a shaft seals system in a high-level waste repository in the Gibson Dome area in southeastern Utah is presented. The analysis of the movement of the permeant in the shaft seals system under partially saturated flow conditions was based on the Green and Ampt theory of infiltration. The analysis of the transport of radionuclides leaching out of the repository was performed using two analytical solutions: a two-dimensional solution which could handle single decaying species in homogeneous soils and a one dimensional solution designed to handle a three-member decay chain in a layered stream tube. Various conservative scenarios of water intrusion into the repository were considered and the impact of these on the travel time of the wetting front in the shaft seals, as well as the potential migration of the radionuclides released from the two types of waste form, are reported. At our present knowledge of field data, the methodology has proved useful in reasonable estimations of some important aspects of the shaft seals performance, as well as in assessments of the potential radiological impact of the release of radionuclides from the repository into the underlying aquifer. The methodology described is not meant to compete with large-scale computer models; however, it is designed to assist the prospective investigator in economical analyses.

53674 **(ORNL/TM—8717) Use of DOE site selection criteria for screening low-level waste disposal sites on the Oak Ridge Reservation.** Lee, D.W.; Ketelle, R.H.; Stinton, L.H. (Oak Ridge National Lab., TN (USA)). Sep 1983. Contract W-7405-ENG-26. 71p. NTIS, PC A04/MF A01. Order Number DE83017992.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The proposed Department of Energy (DOE) site selection criteria were applied to the Oak Ridge Reservation, and the application was evaluated to determine the criteria's usefulness in the selection of a low-level waste disposal site. The application of the criteria required the development of a methodology to provide a framework for evaluation. The methodology is composed of site screening and site characterization stages. The site screening stage relies on reconnaissance data to identify a preferred site capable of satisfying the site selection criteria. The site characterization stage relies on a detailed site investigation to determine site acceptability. The site selection criteria were applied to the DOE Oak Ridge Reservation through the site screening stage. Results of this application were similar to those of a previous siting study on the Oak Ridge Reservation. The DOE site selection criteria when coupled with the methodology that was developed were easily applied and would be adaptable to any region of interest.

53675 **(PNL—4333) Validation of the WATEQ4 geochemical model for uranium.** Krupka, K.M.; Jenne, E.A.; Deutsch, W.J. (Pacific Northwest Lab., Richland, WA (USA)). Sep 1983. Contract AC06-76RL01830. 134p. NTIS, PC A07/MF A01. Order Number DE83017997.

As part of the Geochemical Modeling and Nuclide/Rock/Groundwater Interactions Studies Program, a study was conducted to partially validate the WATEQ4 aqueous speciation-solubility geochemical model for uranium. The solubility controls determined with the WATEQ4 geochemical model were in excellent agreement with those laboratory studies in which the solids schoepite [$UO_3(OH)_2 \cdot H_2O$], $UO_2(OH)_2$, and rutherfordine (UO_2CO_3) were identified as actual solubility controls for uranium. The results of modeling solution analyses from laboratory studies of uranyl phosphate solids, however, identified possible errors in the characterization of solids in the original solubility experiments. As part of this study, significant deficiencies in the WATEQ4 thermodynamic data base for uranium solutes and solids were corrected. Revisions included recalculation of selected uranium reactions. Additionally, thermodynamic data for the hydroxyl complexes of U(VI), including anionic (VI) species, were evaluated (to the extent permitted by the available data). Vanadium reactions were also added to the thermodynamic data base because uranium-vanadium solids can exist in natural ground-water systems. This study is only a partial validation of the WATEQ4 geochemical model because the available laboratory solubility studies do not cover the range of solid

phases, alkaline pH values, and concentrations of inorganic complexing ligands needed to evaluate the potential solubility of uranium in ground waters associated with various proposed nuclear waste repositories. Further validation of this or other geochemical models for uranium will require careful determinations of uraninite solubility over the pH range of 7 to 10 under highly reducing conditions and of uranyl hydroxide and phosphate solubilities over the pH range of 7 to 10 under oxygenated conditions.

53676 **(PNL—4738) Permian potentiometric analysis.** Devary, J.L. (Pacific Northwest Lab., Richland, WA (USA)). Sep 1983. Contract AC06-76RL01830. 40p. NTIS, PC A03/MF A01. Order Number DE83018228.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Pacific Northwest Laboratory (PNL) was requested to analyze potentiometric data from the Wolfcamp Formation of the Permian System to evaluate the recommendations by the University of Texas/Bureau of Economic Geology (UT/BEG) that additional geohydrologic boreholes be drilled into the Wolfcamp. The UT/BEG recommended that two stratigraphic and two geohydrologic borings be drilled into the Permian System during FY83 and that several shallow hydrologic tests be made in the Dockum Formation. A geostatistical technique known as kriging was applied to objectively evaluate these geohydrologic borehole recommendations. The Deaf Smith County location appears to be an excellent choice for a borehole. No high quality potentiometric data are available from Deaf Smith County and a borehole location immediately upgradient from the candidate repository site is needed. Adding this borehole location to the potentiometric data base will significantly reduce field data uncertainty near the location being studied. The Swisher County location does not appear to be the best choice. High quality data values H2206 and H2360 are located immediately upgradient from the proposed repository site. The best placement of additional geohydrological boreholes in the Wolfcamp Formation depends strongly upon the proposed repository location. The variability of the potentiometric data causes estimation errors to rapidly increase away from locations of field measurements. Suggested locations for additional boreholes for the Deaf Smith investigations are in northwest Randall or central Potter Counties. Ideal borehole locations for the Swisher county studies appear to be in southeast Randall and Armstrong Counties.

53677 **(PNL—4844) Potential low-level waste disposal limits for activation products from fusion.** Kennedy, W.E. Jr.; Peloquin, R.A. (Pacific Northwest Lab., Richland, WA (USA)). Sep 1983. Contract AC06-76RL01830. 23p. NTIS, PC A02/MF A01. Order Number DE83018221.

Hanford Engineering Development Laboratory (HEDL) scientists are involved in studies considering alternative construction materials for the first wall of commercial fusion reactors. To permit a comparison of radioactivity levels, both the level of activation and an acceptable limit for the radionuclides present must be known. Generic material composition guidelines can be developed using the US Nuclear Regulatory Commission (NRC) regulations governing the near-surface disposal of low-level radioactive wastes. These regulations consider wastes defined as containing source, special nuclear, or by-product materials arising from research, industrial, medical, and nuclear fuel-cycle activities. However, not all of the activation products produced in low-level wastes from fusion reactors are considered by the NRC in their regulations. The purpose of this report is to present potential low-level waste-disposal limits for ten radionuclides resulting from fusion reactor operations that are not considered in the NRC low-level waste regulations. These potential limits will be used by HEDL scientists to complete their generic material composition guidelines for the first wall of commercial fusion reactors.

53678 **(PNL-SA—11568) Survey of statistical and sampling needs for environmental monitoring of commercial low-level radioactive waste disposal facilities.** Thomas, J.M.; Eberhardt, L.L.; Skalski, J.R. (Pacific Northwest Lab., Richland, WA (USA)). Aug 1983. Contract AC06-76RL01830. 11p. (CONF-8308106—5). NTIS, PC A02/MF A01. Order Number DE83017805.

From 5th. annual participants information meeting of DOE low level waste management program; Denver, CO, USA (30 Aug 1983).

In this paper we present some of the results of Task 1 of a project entitled Application of Statistics in Siting and Managing Commercial Low-Level Radioactive Waste Disposal Sites. Task 1 was designed to develop guidance for determining the overall needs for sampling and statistical work in characterizing, surveying, monitoring, and closing commercial low-level waste sites. The overall project is designed to produce information for developing guidance on implementing 10 CFR Part 61. The focus of this paper is on analytic field sampling (data collected to infer something about the processes that led to the particular configuration of the population being sampled, or as a basis for comparing different subsets of the population) and compositing for cost effective detection of hot spots or radionuclide migration. 21 references, 2 figures.

53679 **(PNL-SA—11579) Monitored retrievable storage: a waste management option for spent fuel and high-level wastes.** Fletcher, J.F. (Pacific Northwest Lab., Richland, WA (USA)). Aug 1983. Contract AC06-76RL01830. 18p. NTIS, PC A02/MF A01. Order Number DE83018286.

One option for managing spent fuel and high-level wastes is the Monitored Retrievable Storage (MRS) concept. This concept will provide for long-term storage of spent fuel and nuclear wastes, under controlled and monitored conditions, in surface or near-surface facilities. The MRS concept is viewed primarily as a means for providing storage of spent fuel and nuclear wastes if mined geologic disposal is not available when needed. Eight concepts are under consideration for the storage of spent fuel and high-level wastes: metal casks, concrete silo, silo-in-trench, field drywells, tunnel drywells, open-cycle vault, closed-cycle vaults, and tunnel rack. All eight concepts for MRS storage are now undergoing engineering evaluation. From this evaluation, two leading concepts will be selected for further design and development. A proposal for facility construction based on these leading designs is scheduled to be delivered to the US Congress in June 1985.

53680 **(RHO-BW-ST—19-P) Preliminary interpretation of the tectonic stability of the reference repository location, Cold Creek syncline, Hanford Site.** Bergstrom, K.A.; Caggiano, J.A.; Cross, R.W.; Davis, J.D.; Duncan, D.W.; Fecht, K.R.; Mitchell, T.H.; Reidel, S.P.; Rohay, A.C. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Mar 1983. Contract AC06-77RL01030. 246p. NTIS, PC A11/MF A01. Order Number DE83018233.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This preliminary interpretation of available geologic, seismologic, geophysical, and geodetic data indicates that the references repository location in the Cold Creek syncline of the Pasco Basin meets the US Nuclear Regulatory Commission and Basalt Waste Isolation Project proposed criteria for tectonic stability. Uncertainties regarding the timing, sequence, and mechanics of fold and fault development will be addressed during the program of detailed site characterization. This preliminary assessment of tectonic stability does not appear to preclude development of a repository in the reference repository location. 230 references.

53681 **(RHO-PB-SR—10-B-WM-JUN-83) Rockwell Hanford Operations. Defense waste and byproducts management monthly report.** (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Jun 1983. Contract AC06-77RL01030. 112p. NTIS, PC A06/MF A01. Order Number DE83016173.

Portions are illegible in microfiche products.

Combined jet pump production for TX and BY Tank Farms in the month of June was approximately 132,000 gallons. The fiscal year-to-date volume pumped is approximately 324,000 gallons versus 350,000 gallons planned. The first shipments of N-Reactor decontamination waste were received from UNC via railroad tank cars in the first week of the month. Two to three shipments per week are being received and a total of thirty-three loads are expected to be received through the middle of August (approximately 500,000 gallons of waste). Twenty-three cesium capsules were pro-

duced in June for a fiscal year-to-date total of 100. A technical plan for the Transportable Grout Facility was compiled, approved, and submitted to DOE-RL. This technical plan addresses the need and background, as well as the objective, strategy, work breakdown structure, schedule, and milestones. Completion of this technical plan represents a significant accomplishment in the grouting of defense nuclear wastes. Both PNL and ORNL participated by contributing to this plan. The B-461 Functional Design Criteria and Preliminary Conceptual Design Report were completed and submitted to the Department of Energy, Richland Operations Office for approval.

53682 **(UJV—6216-CH) Study of borate-phosphate system for fixation of nuclear power plant wastes.** Vojtech, O.; Santarova, M.; Suessmilch, J. (Ustav Jaderneho Vyzkumu CSKAE, Rez (Czechoslovakia)). Aug 1982. 15p. (In Czech). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703088.

The use of standard solidification methods for processing wastes from nuclear power plants containing large amounts of boron and sodium presents some disadvantages. A prospective solution of this problem is the vitrification process. A study is reported of systems based on the phosphate matrix, namely of the system Na_2O-B_2O_3-Al_2O_3-P_2O_5. Four series of samples were prepared differing in the sodium-boron oxide ratio. Final products were examined with regard to their chemical, physicochemical and structural properties. Products suitable for further technological study were typified.

53683 **Thermodiffusional transport in pelagic clay: implications for nuclear waste disposal in geological media.** Thornton, E.C.; Seyfried, W.E. Jr. (Univ. of Minnesota, Minneapolis). *Science (Washington, D.C.);* **220**: 1156-1158(10 Jun 1983).

Thermal gradient experiments in sediment-seawater systems revealed large-scale fluxes of aqueous electrolytic components away from the heat source through thermal diffusion. These findings indicate a need for similar studies in other geological materials of low permeability in order to assess the implications of this phenomenon for various nuclear waste disposal options.

53684 **Numerical analysis of burial ground geography.** Fields, D.E.; Glandon, S.A.; Little, C.A. (Oak Ridge National Lab., TN). *Health Physics;* **44**: No. 6, 655-658(Jun 1983).

The evaluation of consequences of low-level radionuclide waste disposal in shallow burial grounds by computer modeling requires specification of numerous parameters defining the local geoaphy of the burial area. Numerical analysis of the inforamtion available in graphical form constitutes a convenient and time-efficient method of determining many such model parameters. As an example of numerical analysis of graphical data, the authors have used the MAGIC (Map Analysis and Graph Interpretation Code) program to analyze survey plots of the Barnwell, South Carolina, burial ground to determine total surface area of burial trenches and the mean distance from trench areas to an identified aquifer surface seepage point located approx. 1 km distant from the burial area. The procedure utilized required very little operator time, and updating the graphical information allows one to compute new geographic parameters appropriate to future configurations of burial areas at this site.

53685 **Evaluation of a small, inexpensive incinerator for institutional radioactive waste.** Landolt, R.R.; Barton, T.P.; Born, G.S.; Morris, V.R.; Vetter, R.J.; Zimmerman, N.J. (Purdue Univ., West Lafayette, IN). *Health Physics;* **44**: No. 6, 671-675(Jun 1983).

The results of this study showed that a small, pathological incinerator dedicated to treatment of low-level radioactive wastes can give a very substantial volume reduction factor for institutional wastes with a concomitant high economic savings. The incinerator was capable of disposing of a high percentage of the radioactive waste generated at Purdue with a minimal release of non-radioactive emissions to the environment. In addition, a concurrent study showed that animals containing radiolabelled plastic microspheres, a rapidly growing medical research technique, can be incinerated with very little release of the radioactivity to the atmosphere.

53686 **Chemical transport in a fissured rock: verification of a numerical model.** Rasmuson, A. (Royal Inst. of Tech., Stockholm, Sweden); Narasimham, T.N.; Neretnieks. *Water Resources Research;* **18**: No. 5, 1479-1492(Oct 1982). Contract AC03-76SF00098.

Due to the very long-term, high toxicity of some nuclear waste products, models are required to predict, in certain cases, the spatial and temporal distribution of chemical concentration less than 0.001% of the concentration released from the repository. A numerical model, TRUMP, which solves the advective diffusion equation in general three dimensions, with or without decay and source term has been verified. The method is based on an integrated finite difference approach. The studies show that as long as the magnitude of advectance is equal to or less than that of conductance for the closed surface bonding any volume element in the region (that is, numerical Peclet number <2), the numerical method can indeed match the analytic solution within errors of gamma-10^{-3}% or less. The realistic input parameters used in the sample calculations suggest that such a range of Peclet numbers is indeed likely to characterize deep groundwater systems in granitic and ancient argillaceous systems. A sensitivity analysis based on the errors in prediction introduced due to uncertainties in input parameters are likely to be larger than the computational inaccuracies introduced by the numerical model. Currently, a disadvantage in the TRUMP model is that the iterative method of solving the set of simultaneous equations is rather slow when time constants vary widely over the flow region. Although the iterative solution may be very desirable for large three-dimensional problems in order to minimize computer storage, it seems desirable to use a direct solver technique in conjunction with the mixed explicit-implicit approach whenever possible. Work in this direction is in progress.(JMT)

53687 **Process for recovering niobium from uranium-niobium alloys.** Wallace, S.A.; Creech, E.T.; Northcutt, W.G. US Patent Application 6-425,141. 27 Sep 1982. 9p. Contract W-7405-ENG-26.

Niobium is recovered from scrap uranium-niobium alloy by melting the scrap with tin, solidifying the billet thus formed, heating the billet to combine niobium with tin therein, placing the billet in hydrochloric acid to dissolve the uranium and form a precipitate of niobium stannide, then separating the precipitate from the acid.

53688 **Immobilization of radioiodine in synthetic boracite.** Babad, H.; Strachan, D.M. US Patent Application 6-422,519. 23 Sep 1982. 5p. Contract AC06-77RL01030.

A nuclear waste storage product is disclosed in which radioiodine is incorporated in a synthetic boracite. The boracite may be prepared by reacting a transition metal iodide with an alkali horate under mild hydrothermal conditions, drying the reaction product, and then hot pressing.

0530 Environmental Aspects

REFER ALSO TO CITATION(S) 53394, 53649, 53652, 53653, 53673, 53678, 53686, 54919, 54926, 54931, 54951, 54961, 55033

53689 **(ONWI—27) Environmental characterization of bedded salt formations and overlying areas of the Permian Basin.** (NUS Corp., Rockville, MD (USA)). Jul 1983. Contract AC06-76RL01830;AC02-83CH10140. 428p. NTIS, PC A19/MF A01. Order Number DE83018271.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This report constitutes one input to the first stage of site qualification studies. It presents a general environmental characterization of the region that is underlain by the Permian bedded salt formation. The formation covers portions of Colorado, Kansas, New Mexico, Oklahoma, and Texas. The Permian bedded salt formation is one of a number of deep, stable geologic formations being studied for potential locations for nuclear waste repositories. These studies will not necessarily lead to selection of a site. They are intended only to provide information necessary to evaluate the suitability of locations for repositories. The report is intended as a general characterization of the existing environmental setting of the Permian Region with emphasis on land, water, and air characteris-

tics; resources; plant and animal life; and man's organizations and activities. The report provides background information about the role that this regional study will play in the overall plan for environmental impact assessments and statements deemed necessary as input to the decision-making process. Background information on the present concept of nuclear waste repository design and function is also included. The information presented in this report has been summarized from open literature readily accessible to the public. No field work was conducted nor new data used in developing the descriptions contained herein.

0540 Health And Safety

REFER ALSO TO CITATION(S) 53429, 53468, 53479, 53486, 53488, 53489, 53490, 53491, 53492, 53498, 53509, 53511, 53523, 53525, 53531, 53532, 53533, 53534, 53535, 53536, 53553, 53555, 53569, 53576, 53580, 53582, 53607, 53608, 53609, 53611, 53612, 53613, 53614, 53615, 53616, 53617, 53618, 53619, 53620, 53624, 53627, 53631, 53633, 53635, 53643, 53677, 53935, 53988, 54931, 55019, 55021, 55030, 55031, 55034, 55036

53690 (CONF-821005—, pp VI.139-VI.153) **Aerosols from metal cutting techniques typical of decommissioning nuclear facilities - inhalation hazards and worker protection.** Hoover, M.D.; Newton, G.J.; Barr, E.B.; Wong, B.A. (Inhalation Toxicology Research Inst., Albuquerque, NM). 1982. NTIS, PC A99/MF A01. Contract AC04-76EV01013.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

This study was undertaken to enable improved human inhalation risk assessments for industrial workers and to guide in the selection of appropriate control technologies for airborne materials released during metal cutting activities associated with decommissioning nuclear facilities. Mechanical cutting tools evaluated included a multi-wheel pipe cutter, reciprocating saw, band saw, chop saw and large and small grinding wheels. Melting-vaporization cutting techniques included an oxy-acetylene torch, electric arc cut rod and plasma torch. With the exception of the multi-wheel pipe cutter, all devices created aerosols in the respirable size range (less than 10 μm aerodynamic diameter). Time required to cut 2-inch Schedule 40 Type 304L stainless steel ranged from about 0.6 min for the plasma torch to about 3.0 min for the reciprocating saw. Aerosol production rate ranged from less than 10 mg/min for the reciprocating saw to more than 3000 mg/min for the electric arc cut rod. Particles from mechanical tools were irregular in shape while particles from vaporization tools were spheres and ultrafine branched chain aggregates. 15 references, 4 figures, 1 table.

53691 (CONF-821005—, pp VI.154-VI.168) **Aerosols from metal cutting techniques typical of decommissioning nuclear facilities - experimental system for collection and characterization.** Newton, G.J. (Inhalation Toxicology Research Inst., Albuquerque, NM); Hoover, M.D.; Barr, E.B.; Wong, B.A.; Ritter, P.D. 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

Decommissioning of radioactively contaminated sites has the potential for creating radioactive and other potentially toxic aerosols. We describe an experimental system to collect and characterize aerosols from metal cutting activities typical of those used in decommissioning of nuclear facilities. A special enclosure was designed for the experiment and consisted of a 2-in. x 4-in. stud frame with double walls of flame retardant polyethylene film. Large plexiglass windows allowed the cutting operations to be directed and filmed. Ventilation was 8500 L/min (300 CFM) exhausted through HEPA filters. Seven cutting techniques were evaluated: pipe cutter, reciprocating saw, band saw, chop saw, oxy-acetylene torch, electric arc cut rod and plasma torch. Two grinding tools were also evaluated. Materials cut were 2-, 3- and 4-in. dia schedule 40, 80 and 180 type 304L stainless steel pipe. Basic studies were done on uncontaminated pipe. Four-inch-diameter sections of schedule 180 type 304L stainless steel pipe with radioactively contaminated internal surfaces were also cut. The experiments controlled important variables including tools, cutting technique, and type and thickness of material. 15 references, 4 figures, 2 tables.

53692 (CONF-830101—, pp 427) **Mortality followup through 1977 of the white underground uranium miners cohort examined by the US Public Health Service.** Roscoe, R.J.; Waxweiler, R.; Archer, V. (R.A. Taft Labs., Cincinnati, OH). 1983. NTIS, PC A24/MF A01.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

This report extends through 1977 the mortality follow-up of the US Public Health Service cohort of 3362 male uranium miners. The last report on this cohort followed the miners through 1974. The data were analyzed using the lifetable analysis system developed by the National Institute for Occupational Safety and Health (NIOSH). The mean exposure to radon daughters was 821 working level months (WLM); mean period of observation was 19 years. The following significantly elevated standard mortality ratios (SMRs) were calculated: lung cancer (482), certain nonmalignant respiratory disease (NMRD) (499), accidents (331), tuberculosis (409), alcoholism (273), chronic and unspecified nephritis and renal sclerosis (262), rheumatic fever (1093) and certain heart disease (171). The SMR for all causes of death was 158. The main reason for this overall increase in mortality was excess deaths from lung cancer, accidents and NMRD. However, lung cancer was seen to be dropping in the last 3 year period, NMRD appeared to have peaked in 1975 and accidents continued a decline begun in the late 1950s. NIOSH's primary interest in this cohort concerns radiation-induced lung cancer, especially at low WLM levels. Ongoing research includes consideration of WLM dose data and smoking data.

53693 (CONF-830528—Summ., pp III.14) **Optimization of radiation protection in the transportation of radioisotopes.** Palacios, E.; Menossi, C. (Comision Nacional de Energia Atomica, Buenos Aires, Argentina). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53694 (CONF-830528—Summ., pp VI.3) **Cost effectiveness of safety measures applying to natural uranium hexafluoride transportation in France.** Hubert, P. (CEPN, Fontenay-Aux-Roses, France); Pages, P.; Auguin, B. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53695 (CONF-830528—Summ., pp VI.4-VI.5) **Risk analysis methodologies for the transporatation of radioactive materials.** Geffen, C.A. (Pacific Northwest Lab., Richland, WA). 1983. NTIS, PC A21/MF A01. Contract AC06-76RL01830.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53696 (CONF-830528—Summ., pp VI.6-VI.7) **Risk analysis of transporting vitrified high level radioactive waste by train.** Schneider, K.A. (Transnuklear GmbH, Hanau, Germany); Merz, E. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53697 (CONF-830528—Summ., pp VI.8-VI.9) **Nordic study on reactor waste.** Tveten, U. (Inst. for Energy Tech., Kjeller, Norway). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53698 (CONF-830528—Summ., pp VI.10-VI.11) **Transport analyses for determination of man-rem dose rates with regard to different modes of transport, routing and packaging.** Maass, K.E. (Hahn-Meitner-Institut, Berlin, Germany); Weber, P.M.; Geipel, H.; Huebner, H.W.; Weymann, J. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53699 (CONF-830528—Summ., pp VI.12-VI.13) **Risk assessment for truck-transport assuming different concepts of the back-end of the fuel cycle.** Tully, A. (DORNIER SYSTEM, Friedrichshafen, Germany). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53700 (CONF-830528—Summ., pp XII.3-XII.4) **Study of the exposures received by the persons involved in the transportation of radioactive materials.** Hamard, J.; Sousselier, Y. (Commissariat a Energie Atomique, Fontenay-aux-Roses, France). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53701 (CONF-830528—Summ., pp XII.5) **Radiation exposure resulting from the transport of radioactive materials within the United Kingdom.** Shaw, K.B. (National Radiological Protection Board, Chilton, England); Holyoak, B. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53702 (CONF-830528—Summ., pp XII.6-XII.7) **Development of a model for the assessment of radiation dose received by workers in the transport of radioactive materials.** Vohra, K.G.; Nandakumar, A.N. (Bhabha Atomic Research Centre, Bombay, India). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53703 (CONF-830528—Summ., pp XII.8) **Statistical data on the transport of radioactive materials in Italy and radiation dose evaluation to transport workers.** De Marco, I.; Faloci, C.; Mancioppi, S.; Orsini, A. (ENEA, Rome, Italy). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53704 (CONF-830528—Summ., pp XII.9-XII.10) **Radiation exposure due to railway transport of radioactive materials.** Baran, A. (NUKEM GmbH, Hanau, Germany); Pollmann, E. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53705 (CONF-830528—Summ., pp XII.15-XII.16) **Experimental determination of radionuclide release and transport from spent fuel exposed to cask fire environments.** Burian, R.J. (Battelle Columbus Labs., OH); Kok, K.D.; Sandoval, R.P. 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53706 (CONF-830528—Summ., pp XIII.3-XIII.4) **Emergency response guidelines for state and local governments for radioactive material transportation accidents.** Wingert, V. (Federal Emergency Management Agency, Washington, DC); Carricker, A.W.; McClure, J.D. 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53707 (CONF-830528—Summ., pp XIII.5-XIII.6) **Radiological assistance teams.** Vetter, D.E. (Reynolds Electrical & Engineering Co., Inc., Las Vegas, NV). 1983. NTIS, PC A21/MF A01. Contract AC08-76NV00410.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53708 (CONF-830528—Summ., pp XIII.7) **Model railroad industry nuclear emergency response plant.** Furber, C.P. (Association of American Railroads, Washington, DC). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53709 (CONF-830528—Summ., pp XIII.8) **Radiological response training for law enforcement personnel.** Maixner, R.D. (Reynolds Electrical & Engineering Co., Inc., Las Vegas, NV). 1983. NTIS, PC A21/MF A01. Contract AC08-76NV00410.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53710 (CONF-830528—Summ., pp XIII.9-XIII.10) **Things that can go wrong when time is of the essence.** Rymer, A.C. (Science Applications, Inc., Oak Ridge, TN); Taynton, L.F.; Blalock, L.G. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53711 (CONF-830528—Summ., pp XV.3-XV.4) **Contamination studies on pond-loaded casks.** Bond, R.D.; Curren, W.D. (United Kingdom Atomic Energy Authority, Winfrith, England). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53712 (CONF-830528—Summ., pp XV.5) **Fundamental studies of the ionic contamination of painted surfaces.** Gwyther, J.R.; Haighton, A.P.; Hancock, R.; Rodliffe, R.S.; Thornton, E.W. (Central Electricity Generating Board, Berkeley, England). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53713 (SAND—82-1998C) **Some design considerations for cask handling at large-scale shipping and receiving facilities.** Yount, J.A.; Berger, J.D.; Shirley, C.G. (Hanford Engineering Development Lab., Richland, WA (USA); Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 9p. (CONF-830528—27). NTIS, PC A02/MF A01. Order Number DE83013464.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

Portions are illegible in microfiche products.

Conceptual equipment and procedures for controlling worker exposures during shipment handling are discussed.

0550 Regulations

REFER ALSO TO CITATION(S) 53499, 53536, 53538

53714 (CONF-830528—Summ., pp XXII.B.3) **Cargo security: a review of physical security techniques for shipping radioactive materials.** Lamb, J.A. Sr. (Science Applications, Inc., Oak Ridge, TN). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53715 (CONF-830528—Summ., pp XXII.B.4-XXII.B.5) **How to sit most comfortably between two chairs or how to implement physical protection measures for transport.** Schueler, R. (Transnuklear GmbH, Hanau, Germany). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53716 (CONF-830528—Summ., pp XXII.B.6-XXII.B.7) **Goal system for comparative assessments of nuclear fuel transport under security aspects.** Behrendt, V.; Schwieren, G. (Dornier System GmbH, Friedrichshafen, Germany). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53717 (CONF-830528—Summ., pp XXII.B.8-XXII.B.9) **Physical security measures for the transportation of specially categorized nuclear material.** Alter, U. (Gesellschaft fuer Reaktorsicherheit (GRS) mbH, Koeln, Germany); Herkommer, E.; von Dobschuetz, P. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53718 (NUREG/CR—1246-Vol.4) **SAFE users manual. Volume 4. Computer programs.** Grady, L.M. (Sandia National Labs., Albuquerque, NM (USA)). Jun 1983. Contract AC04-76DP00789. 175p. (SAND—79-2247/4). NTIS, PC E07/MF A01 - GPO. Order Number DE83017842.

Includes 2 sheets of 48x reduction microfiche.

Documentation for the Safeguards Automated Facility Evaluation (SAFE) computer programs is presented. The documentation is in the form of subprogram trees, program abstracts, flowcharts, and listings. Listings are provided on microfiche.

53719 (NUREG/CR—3264) **Parametric effects on nondestructive-assay techniques. Final report.** Bernatowicz, H.; Borgonovi, G.; Epperson, D.; Glancy, J.; Gozani, T.; Hagan, W.; Harlan, R.; Hope, E.; Horton, W.; McDaniel, T. (Science Applications, Inc., La Jolla, CA (USA)). Aug 1983. 293p. (SAI—1583-368LJ). NTIS, PC A13/MF A01 - GPO $7.50. Order Number DE83910829.

Portions are illegible in microfiche products.

The purpose of the study was to investigate the effect of parameters on nondestructive techniques used for the assay of nuclear material, firstly by an assessment of the current knowledge of parametric effects, and secondly by carrying out experiments on selected parameters. The techniques examined were passive gamma NDA, passive neutron NDA, active NDA, densitometry, and calorimetry. For each technique, operational, intrinsic, and external parameters were identified in a systematic way, and the need for experiments to provide additional information on the effect of selected parameters was also identified. In the area of passive gamma NDA, experiments were conducted to investigate the effect of nonhomogeneity of nuclear material, and a theoretical approach for the description of the effect of nonhomogeneity was developed. The approach can be used as a corrective technique. In the area of passive neutron NDA, experiments were conducted to determine the effect of small amounts of matrix having different moderating and absorbing characteristics. In the area of active NDA, experiments were conducted to investigate the effects of matrix and spatial distribution on coincidence counting in a fission multiplicity detector, and to test methods for minimizing the effects.

53720 (NUREG/CR—0200-Vols.1-2-3-Bk.5) **SCALE: a modular code system for performing standardized computer analyses for licensing evaluation.** (Oak Ridge National Lab., TN (USA)). Jun 1983. Contract W-7405-ENG-26. 398p. (ORNL/NUREG/CSD—2/R2-Bk.5). NTIS, PC A17/MF A01 - GPO $8.50. Order Number DE83017853.

Books IV and V of this manual provide additional documentation for a multi faceted computational system called SCALE (Standardized Computer Analyses for Licensing Evaluation) that has been developed to provide a standard analysis tool for use by the NRC staff and licensees in evaluation of nuclear fuel facility and package designs. The SCALE system consists of several automated analytical sequences (control modules) which perform criticality, shielding, and/or heat transfer calculations with a minimum of user-required input. The computer codes (functional modules) used within each analytical sequence can also be run in a standalone fashion or coupled together in a sequence determined by the user. This book covers: control modules, functional modules, and miscellaneous.

53721 (NUREG/CR—0200-Vols.1-2-3-Bk.4) **SCALE: a modular code system for performing standardized computer analyses for licensing evaluation.** (Oak Ridge National Lab., TN (USA)). Jun 1983. Contract W-7405-ENG-26. 326p. (ORNL/NUREG/CSD—2/R2-Bk.4). NTIS, PC E12/MF A01 - GPO $9.00. Order Number DE83017843.

Includes 2 sheets of 48x reduction microfiche.

Books IV and V of this manual provide additional documentation for a multi faceted computational system called SCALE (Standardized Computer Analyses for Licensing Evaluation) that has been developed to provide a standard analysis tool for use by the NRC staff and licensees in evaluation of nuclear fuel facility and package designs. The SCALE system consists of several automated analytical sequences (control modules) which perform criticality, shielding, and/or heat transfer calculations with a minimum of user-required input. The computer codes (functional modules) used within each analytical sequence can also be run in a standalone fashion or coupled together in a sequence determined by the user. This book includes: SAS 2 method, application and limits, program flow, input data description, and sample cases.

53722 **Method and apparatus for measuring reactivity of fissile material.** Lee, D.M.; Lindquist, L.O. US Patent Application 6-415,616. 7 Sep 1982. 24p. Contract W-7405-ENG-36.

Given are a method and apparatus for measuring nondestructively and noninvasively (i.e., using no internal probing) the burnup, reactivity, or fissile content of any material which emits neutrons and which has fissionable components. The assay is accomplished by altering the return flux of neutrons into the fuel assembly by means of changing the reflecting material. The existing passive neutron emissions in the material being assayed are used as the source of interrogating neutrons. Two measurements of either emitted neutron or emitted gamma-ray count rates are made and are then correlated to either reactivity, burnup, or fissionable content of the material being assayed, thus providing a measurement of either reactivity, burnup, or fissionable content of the material being assayed. Spent fuel which has been freshly discharged from a reactor can be assayed using this method and apparatus. Precisions of 1000 MWd/tU appear to be feasible.

53723 **Stabilized aqueous foam systems, concentrate for producing a stabilized aqueous foam and method of producing said foam.** Rand, P.B. US Patent Application 6-438,126. [nd]. 20p. Contract AC04-76DP00789.

This invention comprises a combination of a water soluble polymer of the polyacrylic acid type, a foam stabilizer of dodecyl alcohol, a surfactant, a solvent and water as a concentrate for use in producing stabilized aqueous foams. In another aspect, the invention comprises a solution of the concentrate with water. In still another aspect the invention includes a method of generating stabi-

lized aqueous foams. The stable foams have utility in security systems.

06 FUSION FUELS

0602 Processing

53724 **Method of forming graded polymeric coatings or films.** Liepins, R. (to Dept. of Energy). US Patent 4,390,567. 28 Jun 1983. Filed date 11 Mar 1981. vp.

PAT-APPL-242807.

Very smooth polymeric coatings or films graded in atomic number and density can readily be formed by first preparing the coating or film from the desired monomeric material and then contacting it with a fluid containing a metal or a mixture of metals for a time sufficient for such metal or metals to sorb and diffuse into the coating or film. Metal resinate solutions are particularly advantageous for this purpose. A metallic coating can in turn be produced on the metal-loaded film or coating by exposing it to a low pressure plasma of air, oxygen, or nitrous oxide. The process permits a metallic coating to be formed on a heat sensitive substrate without the use of elevated temperatures.

53725 **Coated foams, preparation, uses and articles.** Duchane, D.V.; Barthell, B.L. US Patent Application 6-435,796. 21 Oct 1982. 19p. Contract W-7405-ENG-36.

Portions are illegible in microfiche products.

Hydrophobic cellular material is coated with a thin hydrophilic polymer skin which stretches tightly over the foam but which does not fill the cells of the foam, thus resulting in a polymer-coated foam structure having a smoothness which was not possible in the prior art. In particular, when the hydrophobic cellular material is a specially chosen hydrophobic polymer foam and is formed into arbitrarily chosen shapes prior to the coating with hydrophilic polymer, inertial confinement fusion (ICF) targets of arbitrary shapes can be produced by subsequently coating the shapes with metal or with any other suitable material. New articles of manufacture are produced, including improved ICF targets, improved integrated circuits, and improved solar reflectors and solar collectors. In the coating method, the cell size of the hydrophobic cellular material, the viscosity of the polymer solution used to coat, and the surface tension of the polymer solution used to coat are all very important to the coating.

53726 **Fabrication of glass microspheres with conducting surfaces.** Elsholz, W.E. US Patent Application 6-429,924. 30 Sep 1982. 13p. Contract W-7405-ENG-48.

A method for making hollow glass microspheres with conducting surfaces by adding a conducting vapor to a region of the glass fabrication furnace. As droplets or particles of glass forming material pass through multiple zones of different temperature in a glass fabrication furnace, and are transformed into hollow glass microspheres, the microspheres pass through a region of conducting vapor, forming a conducting coating on the surface of the microspheres.

0604 Transport And Storage

REFER ALSO TO CITATION(S) 53745

0607 Waste Management

53727 **(UCRL—89511) Disposal of activated fusion wall materials.** Blink, J.A.; Dorn, D.W.; Maninger, R.C. (Lawrence Livermore National Lab., CA (USA)). Aug 1983. Contract W-7405-ENG-48. 8p. (CONF-830942—3). NTIS, PC A02/MF A01. Order Number DE83017841.

From 3. topical meeting on fusion reactor materials; Albuquerque, NM, USA (19 Sep 1983).

We have used NRC's low-level waste disposal regulation (10CFR61) to classify activated fusion reactor structural materials. The limits set by the NRC in 10CFR61 will require extremely expensive steels with degraded properties, even when the limits are adjusted to give credit for use of an expensive hot waste disposal facility. Both the expense and the poorer properties could have a negative impact on reactor safety, thus subverting the overall goals of the NRC family of regulations. Following this initial study, we have examined the methodology used by the NRC to set waste concentration limits. For a long-lived gamma emitter like ^{94}Nb, direct gamma dose to an intruding home builder dominates the limit setting process. Of all the tests applied to the waste, the controlling test which sets the lowest limit ignores all the engineered intrusion barriers which are themselves required by the same regulation. If even a small fraction of the barriers remain intact (an extremely likely event), the ^{94}Nb limit could be increased from the 0.2 Ci/m^3 in 10CFR61 to 1100 Ci/m^3 without exceeding the limits set for personnel exposure. Similarly, cautious application of the 10CFR61 methodology to other radioisotopes of interest to fusion designers will result in limits which are more in line with the unique nature of fusion energy.

07 ISOTOPE AND RADIATION SOURCE TECHNOLOGY

53728 **(ZfI-Mitt—55) Report of the Central Institute for Isotope and Radiation Research.** (Akademie der Wissenschaften der DDR, Leipzig. Zentralinstitut fuer Isotopen- und Strahlenforschung). Aug 1982. 83p. NTIS (US Sales Only), PC A05/MF A01. Order Number DE83781080.

Individual items in scope for the data base were processed separately.

53729 **(ZfI-Mitt—60) Report of the Central Institute for Isotope and Radiation Research.** (Akademie der Wissenschaften der DDR, Leipzig. Zentralinstitut fuer Isotopen- und Strahlenforschung). Nov 1982. 55p. NTIS (US Sales Only), PC A04/MF A01. Order Number DE83781079.

Individual items in scope for the data base are processed separately.

0701 Physical Isotope Separation

53730 **(DOE/ER/01023—6) Study of mechanism of hydrogen diffusion in separation devices. Progress report for 1980-1983.** Lee, M.H. (Georgia Univ., Athens (USA). Dept. of Physics). 15 Aug 1983. Contract AS09-77ER01023. 25p. NTIS, PC A02/MF A01. Order Number DE83016388.

For the purpose of studying the mechanisms of hydrogen diffusion in separation devices e.g. transition-metal membranes, we have developed a microscopic dynamic model appropriate for describing the nonequilibrium statistical mechanics of hydrogen-in-a-metal. Using this model we have carried out a detailed analysis to obtain the autocorrelation function of density fluctuations in the model. Our model is built on the physical idea that, at low temperatures, spin clusters are the basic units or aggregates of transport. Our work can explain the reversed isotope effect in diffusion. We have also obtained an expression for the relative diffusivity, verifiable by experiments with tritium in metals. Our notion of spin clusters is novel. There is some evidence of their existence. The interstitial spin clusters are comparable to atomic and nuclear spin clusters, the only other natural spin clusters. Our demonstration of a long-time tail in the autocorrelation function is also novel. Diffusion can be anomalous if long time tails exist, a current topic in nonlinear behavior of fluids and solids. Our progress has been made possible by our development in the mathematical method of solving the generalized Langevin equation. This method is applicable to any time-dependent quantum many-body model. The underlying basis of this method is our discovery of a new orthogonalization process in Hilbert space, first since Gram and Schmidt over 100 years ago. Our process is simpler if Hilbert space is realized as is for all physical problems. To demonstrate the power and utility of our method we considered a well established model of metals, thereby discovering the existence of a low-frequency electronic mobility. This kind of intrinsic conductivity should exist in ensembles of all light particles, hence also relevant to hydrogen and its isotopes in metals.

53731 **(PNL—4759) List of DOE radioisotope customers with summary of radioisotope shipments, FY 1982.** Richards, M.P. (Pacific Northwest Lab., Richland, WA (USA)). Aug 1983. Contract AC06-76RL01830. 48p. NTIS, PC A03/MF A01. Order Number DE83017881.

The radioisotope production and distribution activities by facilities at Argonne National Laboratory, Pacific Northwest Laboratory, Brookhaven National Laboratory, Hanford Engineering Development Laboratory, Idaho Operations Office, Los Alamos Scientific Laboratory, Oak Ridge National Laboratory, Savannah River Laboratory, and UNC Nuclear Industries, Inc. are listed. The information is divided into five sections: isotope suppliers, facility, contacts, and isotopes or services supplied; alphabetical list of customers, and isotopes purchased; alphabetical list of isotopes cross-referenced to customs numbers; geographical location of radioisotope customers; and radioisotope sales and transfers-FY 1982. (MHR)

0702 Radiation Sources

53732 **(KURRI-TR—218) Experimental studies on the production of ultra cold neutrons by using an accelerator neutron source.** Okumura, K.; Utsuro, M. (Kyoto Univ., Kumatori, Osaka (Japan). Research Reactor Inst.). 25 Jan 1982. 30p. (In Japanese). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83703007.

Recently, various kinds of experiments making use of special properties of Very Cold Neutrons (VCN) and Ultra Cold Neutrons (UCN) are proposed. For example, UCN with the velocity below several m/s can be totally reflected at flat surfaces of selected materials, and a novel device called "Neutron bottle" which can contain UCN for a long time becomes possible to be realized in a laboratory. Experiments on fundamental physics by using the neutron bottle are now under preparation in several laboratories. However, one of the most difficult points of this kind of experiment is the very weak intensity of UCN obtained from usual neutron sources and the severe attenuation of UCN in the course of their extraction to the place of an experimental apparatus. Therefore, as the first step for the beginning of the experiments in this field, the production properties and the handling methods of UCN are studied experimentally in our Institute. In the present report, these processes and various results on the production, handling and measurements of UCN and VCN by using the combination of the KUR electron linac and the cold source are described in detail.

08 HYDROGEN

53733 (CONF-8208148—, pp 237-241) **Hydrogen in energy.** Kelley, J.H. (Jet Propulsion Lab., Pasadena, CA). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

The value of hydrogen to Hawaii's future energy needs is discussed. Hydrogen, which can be derived from the world's abundant supply of water, is seen to be the logical fuel choice when hydrocarbon resources become exhausted. The technical feasibility of hydrogen production, storage, and use has been established, but its economic feasibility has not. The uses of hydrogen as a direct and indirect fuel are explained. 3 references, 3 figures.

0801 Production

REFER ALSO TO CITATION(S) 53770, 53784, 54341

53734 **(BNL—51686) Chemical/hydrogen energy systems multi-year R and D plan.** Beller, M.; Mezzina, A. (Brookhaven National Lab., Upton, NY (USA)). May 1983. Contract AC02-76CH00016. 47p. NTIS, PC A03/MF A01. Order Number DE83017690.

This report provides a description of the research and development priorities associated with the mission of the Chemical/Hydrogen Energy Systems (C/HES) Program at Brookhaven National Laboratory (BNL). BNL is the technical and management arm for this program on behalf of the Office of Energy Systems Research, Division of Energy Storage Technology, Department of Energy (DOE), and operates under DOE policy and budgetary guidance. The emphasis of the C/HES Program is focused upon fundamental and exploratory research geared toward the development of a future technology base, in particular, the use of hydrogen derived from abundant and renewable resources as an energy carrier and storage medium. Programs are pursued based upon criteria that stress high-risk, high-payoff, long-term ventures. This study provides a system analysis of the present status and future potential of various hydrogen production, storage, transmission, and use options. It concludes that research and development priorities should focus upon these options in the order stated above. Additionally, within each category selected technologies are outlined for specific research effort based upon a multi-objective analysis. In particular, hydrogen production options should stress work in the areas of high temperature electrolysis and anode depolarization. In the storage area, a variety of novel options seem amenable for investigation at reduced levels of expenditure. Transmission/distribution system requirements are also outlined. A detailed budgetary breakdown and a multi-year operating plan conclude the report. 40 references.

53735 **Kinetics of hydrogen production from methyl viologen radicals on colloidal platinum.** Matheson, M.S. (Argonne National Lab., IL); Lee, P.C.; Meisel, D.; Pelizzetti, E. *Journal of Physical Chemistry;* 87: No. 3, 394-399(3 Feb 1983). Contract W-31-109-ENG-38.

The kinetics of hydrogen evolution from colloidal Pt catalyst reacting with methyl viologen radicals was studied in detail and the results are compared with those in previous studies of the same reaction catalyzed by gold sols. The major difference between the two catalysts is in the rate of the proton discharge step. In the Pt-catalyzed reaction this step follows immediately the electron transfer reaction from the reductant to the particle. The Pt particle may therefore be viewed as a storage pool of hydrogen atoms rather than electrons. The dependence of the rate on catalyst concentration in Pt, as well as in Au, is second order in the catalyst and the possibility of a particle-particle reaction is further examined.

53736 **Solar production of hydrogen. A biological approach.** Olson, J.M.; Bernstein, J.D. (Biology Dept, Brookhaven National Lab, Upton, NY 11973, USA). *Industrial and Engineering Chemistry, Product Research and Development;* 21: No. 4, 640-646(1982).

0802 Storage

REFER ALSO TO CITATION(S) 53734

0803 Transport

REFER ALSO TO CITATION(S) 53734

53737 **(BNL-tr—1006) Design calculations for a gas pipeline for the transport of solar-produced hydrogen over large distances taking non-stationary operating conditions into account.** Steyer, H. (Brookhaven National Lab., Upton, NY (USA); Stuttgart Univ. (Germany, F.R.). Inst. fuer Kernenergetik und Energiesysteme). Feb 1982. Contract AC02-76CH00016. Translation of Thesis from University of Stuttgart. 72p. NTIS, PC A04/MF A01. Order Number DE83017622.

Portions are illegible in microfiche products.

For solar production of hydrogen the gas flow is proportional to the solar radiation (during the night Q = 0). The stationary transport of this gas flow by pipeline over a long distance demands buffer-storage of suitable size. The other possibility is the use of the volume of the pipeline as a buffer-storage. In this case, one has to deal with an instationary gas flow. For both cases a pipeline is layed out for a transport distance of 2000 and 3000 km. The resulting costs are calculated and compared. 26 references.

0804 Marketing And Economics

REFER ALSO TO CITATION(S) 53737

0806 Industrial And Commercial Use

53738 **(PB—83-205443) Hydrogen engine induction technique for backfire-free operation. Contract research report Apr 81-May 82.** Baker, N.; Lynch, F. (Eimco Mining Machinery International, Salt Lake City, UT (USA)). 20 May 1982. 47p. NTIS, PC A03/MF A01.

Details are given of a fuel-induction system for a hydrogen-fueled engine. The induction system was designed to preclude backfire otherwise common in hydrogen-fueled engines. System features and test data are presented and discussed in the context of the requirements peculiar to use in an underground mine environment. The fuel induction-system, when tested in conjunction with a modified Caterpillar 3304 engine, provided backfire-free engine operation and satisfactory engine performance.

09 OTHER SYNTHETIC AND NATURAL FUELS

0901 Hydrocarbon Fuels

REFER ALSO TO CITATION(S) 53443, 53768, 53774, 53778, 54070

53739 **(PB—83-224733) Modeling of hydrocarbon fires. Subreport No. 1.** Stensaas, J.P.; Amundsen, J.H. (SINTEF, Trondheim (Norway)). 24 Jan 1983. 70p. (STF—25-A82009). NTIS, PC E04/MF E04.

The aim of the project is to estimate critical fire load from different types of hydrocarbon fires. This first subreport gives a brief examination of the theory in enclosures and a review of fire modeling up to date. On the basis of this there has been choosen a modeling/scaling method and a program in order to carry out the experiments.

53740 **Photochemical cycloadditions of 2,3-dihalobenzo[b]thiophenes: stereochemical and mechanistic results.** Neckers, D.C. (Bowling Green State Univ., OH); Wagenaar, F.L.; Hauenstein, D.; Jacobson, R.A. *Journal of Organic Chemistry;* **48**: No. 10, 1725-1732(20 May 1983).

Synthetic approaches to 2-thia-3,4-benzobicyclo[3.2.0]-1,3,6-heptatriene and to 2-thia-3,4-benzobicyclo[3.2.0]-1,3-heptadiene required halogenated cyclobutanes derived from [/sub π/2/sub s/ + /sub π/2/sub s/] photocycloadditions of 2,3-dichlorobenzo[b]thiophene and either vinyl bromide or 1,2-dichloroethylene. Addition reactions of vinyl bromide and dichloroethylene with 2,3-dichlorobenzo[b]thiophene and with 2,3-dibromobenzo[b]thiophene are reported. X-ray crystal structures of the two adducts derived from vinyl bromide and 2,3-dibromobenzo[b]thiophene specify their stereochemistry. The adducts to 2,3-dibromobenzo[b]thiophene are linear, and structure determinations for these compounds are also reported. 2 figures, 1 table.

0902 Alcohol Fuels

REFER ALSO TO CITATION(S) 53768, 53769, 53774, 53778, 54070

53741 **(CONF-8308107—1) Ethanol production by Zymomonas mobilis.** Strandberg, G.W.; Scott, C.D.; Donaldson, T.L.; Worden, R.M. (Oak Ridge National Lab., TN (USA)). 1983. Contract W-7405-ENG-26. 25p. NTIS, PC A02/MF A01. Order Number DE83017251.

From 3. Pan American symposium on fuels and chemicals by fermentation; Antigua, Guatemala (24 Aug 1983).

Research progress is described on the development of laboratory-scale columnar bioreactors utilizing the flocculent bacterium, X. mobilis, for ethanol production. X. mobilis forms stable, ball-like aggregates which maintain structural integrity even when subjected to the high shear forces generated in the active 3-phase fluidized-bed reactors. Cell retention and ethanol production were studied using 3 bioreactor configurations. Ethanol productivity appeared to be primarily affected by glucose feed concentration. In addition, it was found that in the absence of nutrients, the level of ethanol productivity can be maintained for at least 1 h before a severe drop occurred. Ethanol inhibition is considered to be a limiting factor in ethanol production. (DMC)

53742 **(DOE/CS/54045—1-Vol.1-Summ.) Assessment of ether and alcohol fuels from coal. Volume I. Summary. Final report.** (Suntech, Inc., Marcus Hook, PA (USA). Applied Research Dept.). Mar 1983. Contract AC04-78CS54045. 71p. NTIS, PC A04/MF A01. Order Number DE83017589.

A unique route for the indirect liquefaction of coal to produce transportation fuel has been evaluated. The resultant fuel includes alkyl tertiary alkyl ethers and higher alcohols, all in the gasoline boiling range. When blended into gasoline, the ether fuel provides several advantages over the lower alcohols: (1) lower chemical oxygen content, (2) less severe water separation problems, and (3) reduced front-end volatility effects. The ether fuel also has high octane quality. Further, it can be utilized as a gasoline substitute in all proportions. Vehicle performance tests of blends of a prototype ether fuel in gasoline, covering the concentration range from 0 to 100%, are described. Production of ether fuel combines several steps, all of which are or have been practiced on an industrial scale: (1) coal gasification, (2) gas cleanup and shift to desired H_2:CO ratio, (3) conversion of synthesis gas to isobuanol, methanol, and higher alcohols, (4) separation of alcohols, (5) chemical dehydration of isobutanol to isobutylene, and (6) etherification of isobutylene with methanol. A pilot plant investigation of the isobutanol synthesis step provided process information necessary to develop a preliminary engineering design and to project prototype ether fuel compositions. Estimates of ether fuel manufacturing costs indicate this process route is significantly more costly than synthesis of methanol. The fuel performance features provide incentive for developing the necessary process and catalyst improvements. Co-production of higher moelcular weight co-solvent alcohols represents a less drastic form of methanol modification to achieve improvement in the performance of methanol-gasoline blends. Costs were estimated for producing several proportions of methanol plus higher alcohols from coal. Estimated fuel selling price increases regularly but modestly with higher alcohol content.

53743 **(DOE/ID/12140—T1) Brewing industry potential for the immediate and near-term production of fuel-grade ethyl alcohol. Final report.** Mulloney, J.A. Jr. (American Solarhol Corp., Baltimore, MD; Mueller Associates, Inc., Baltimore, MD (USA)). 15 Apr 1980. Contract AP07-80ID12140. 83p. NTIS, PC A05/MF A01. Order Number DE83017844.

Portions are illegible in microfiche products.

The brewing industry is described as it relates to productive facilities and potential for fuel grade ethyl alcohol production. The brewing process is compared to the fuel grade ethyl alcohol process in a brewery. A description is given for retrofitting a brewery as a distilled spirits plant. The following are included: estimated capital requirements and alcohol costs, targets of opportunity, barriers and actions affecting brewery production of ethyl alcohol, suggested action programs, and recommended program activities. (MHR)

53744 **(SERI/TR—231-1887) Evaluation of nondistillation ethanol-separation processes.** Douglas, L.; Feinberg, D. (Solar Energy Research Inst., Golden, CO (USA)). Jul 1983. Contract AC02-77CH00178. 34p. NTIS, PC A03/MF A01. Order Number DE83011994.

The purpose of this report is to present an assessment of several alternatives to distillation as a means of separating ethanol from fermentation beers. Process flowsheets, capital and operating cost summaries, and energy requirements are presented. Each process is assessed in terms of nearness to commercial adaptability and ranked according to energy-efficiency and cost using a state-of-the-art distillation process for comparison. While this review is based on preliminary data in some cases, it is clear that certain of these processes have technical and economic potential for displacing all, or por-

tions of, the distillation units in an alcohol plant. 14 figures, 4 tables.

53745 **Transport containers for dangerous goods.** Mayer, H.J. pp 196 of Trends of development in the transport of dangerous goods. Koeln, Germany, F.R.; Verl. TUEV Rheinland (1982). (In German)(CONF-8203146—1).

From Colloquium on development trends in the transport of dangerous goods; Koeln-Poll, F.R. Germany (10 Mar 1982).

Besides the proper choice of the material, the following factors are important for a sufficiently safe concept of containers: - test and calculated overpressure, - adequate protection from strain caused by static and dynamic loads, - response pressure and blowoff quantity of overpressure valves. In this connection, particular importance is attributed to the calculation and design of containers and the protection of the equipment.

0904 Solid Waste And Wood Fuels

REFER ALSO TO CITATION(S) 53346, 53347, 54070

53746 **(DOE/R5/10307—1) Technical and economic feasibility of utilizing apple pomace as a boiler feedstock.** Sargent, S.A. (Michigan State Univ., East Lansing (USA). Dept. of Agricultural Engineering). 1983. Contract FG02-81R510307. 100p. NTIS, PC A05/MF A01. Order Number DE83017449.

Apple pomace or presscake, was evaluated for suitability as a boiler feedstock for Michigan firms processing apple juice. Based upon the physical and chemical characteristics of pomace, handling/direct combustion systems were selected to conform with operating parameters typical of the industry. Fresh pomace flow rates of 29,030 and 88,998 kg/day (64,000 and 194,000 lb/day) were considered as representative of small and large processors, respectively, and the material was assumed to be dried to 15% moisture content (wet basis) prior to storage and combustion. Boilers utilizing pile-burning, fluidized-bed-combustion, and suspension-firing technologies were sized for each flow rate, resulting in energy production of 2930 and 8790 kW (10 and 30 million Btu/h), respectively. A life-cycle cost analysis was performed giving Average Annual Costs for the three handling/combustion system combinations (based on the Uniform Capital Recovery factor). An investment loan at 16% interest with a 5-year payback period was assumed. The break-even period for annual costs was calculated by anticipated savings incurred through reduction of fossil-fuel costs during a 5-month processing season. Large processors, producing more than 88,998 kg pomace/day, could economically convert to a suspension-fired system substituting for fuel oil, with break-even occurring after 4 months of operation of pomace per year. Small processors, producing less than 29,030 kg/day, could not currently convert to pomace combustion systems given these economic circumstances. A doubling of electrical-utility costs and changes in interest rates from 10 to 20% per year had only slight effects on the recovery of Average Annual Costs. Increases in fossil-fuel prices and the necessity to pay for pomace disposal reduced the cost-recovery period for all systems, making some systems feasible for small processors. 39 references, 13 figures, 10 tables.

13 HYDRO ENERGY

53747 **(PB—83-228726) Chinese experiences in small mini hydro power generation.** (United Nations Industrial Development Organization, Vienna (Austria)). 2 Feb 1982. 174p. NTIS, PC E08/MF E01.

UNIDO pub on experience in mini-hydroelectric power generation (MHG) in China - covers (1) hydro-power resources; river development and construction of MHGs; social aspects, economic aspects, planning, implementation and operation of MHGs (2) policies and measures; economic analysis; comparison with other energy sources (3) engineering design; hydrology; floods (4) water energy (5) turbines, machinery and equipment (6) research, choice of technology, prestressed concrete pipes, valves; innovation; MHG personnel training; costs reduction; dams. Statistics, diagrams, illustrations.

1302 Site Geology And Meteorology

53748 **(AD-A—129735/7) Reconnaissance report for hydropower, Lock and Dam 8, Mississippi River. Preliminary report.** (Corps of Engineers, St. Paul, MN (USA). St. Paul District). Sep 1981. 138p. NTIS, PC A07/MF A01.

This report presents a preliminary evaluation of the addition of hydropower at the existing navigation Lock and Dam 8. The study shows that installation of a hydroplant with 8,750 kW (kilowatt) nameplate rating is economical. Pertinent data concerning the site and potential hydropower installations are given. Severe environmental impacts are not necessarily associated with construction of a plant of the sizes investigated despite the proximity of the lock and dam to an environmentally sensitive area. The District Engineer recommends that the Corps of Engineers prepare a feasibility report which can serve as a basis for congressional authorization for hydropower plant construction at Lock and Dam 8.

53749 **(AD-A—129771/2) Lock and Dam 7 Mississippi River near La Crosse, Wisconsin. Reconnaissance report for hydropower. Preliminary report.** (Corps of Engineers, St. Paul, MN (USA). St. Paul District). Dec 1980. 177p. NTIS, PC A09/MF A01.

This report presents a preliminary evaluation of the addition of hydropower at the existing navigation Lock and Dam 7. The study shows that installation of a hydro plant with a 4,800-kW (kilowatt) or 7,200-kW nameplate rating is economical. Pertinent data concerning the site and two optional installations are given. Severe environmental impacts do not appear to be associated with construction of a plant of the sizes investigated despite the proximity of the lock and dam to an environmentally sensitive area. The District Engineer recommends that the Corps of Engineers prepare a feasibility report which can serve as a basis for congressional authorization for hydropower plant construction at Lock and Dam 7.

53750 **(AD-A—129836/3) Reconnaissance report for hydropower, Lock and Dam number 2, Mississippi River. Preliminary report.** (Corps of Engineers, St. Paul, MN (USA). St. Paul District). Sep 1981. 154p. NTIS, PC A08/MF A01.

This report presents a preliminary evaluation of the addition of hydropower at the existing navigation Lock and Dam 2. The study shows that installation of a hydroplant with a 4,000-kW (kilowatt) or 5,000-kW nameplate rating is economical. Pertinent data concerning the site and two optional installations are given. Severe environmental impacts do not appear to be associated with construction of a plant of the sizes investigated. The District Engineer recommends that the Corps of Engineers prepare a feasibility report which can serve as a basis for congressional authorization for hydropower plant construction at Lock and Dam 2.

53751 **(AD-A—129840/5) Lock and Dam 1, Mississippi River, Minneapolis - St. Paul, Minnesota. Reconnaissance report for hydropower. Preliminary report.** (Corps of Engineers, St. Paul, MN (USA). St. Paul District). Sep 1981. 129p. NTIS, PC A07/MF A01.

This report presents a preliminary evaluation of additional hydropower at the existing navigation Lock and Dam 1. An existing hydropower plant at the site has a capacity of 14,400-kW. The study shows that installation of a new additional hydroplant with a 4,000-kW or 8,000-kW nameplate rating is economical. Pertinent data concerning the site and two optional installations are given. Severe environmental impacts do not appear to be associated with construction of a new plant of the sizes investigated. The District Engineer recommends that the Corps of Engineers prepare a feasibility report which can serve as a basis for congressional authorization for hydropower plant construction at Lock and Dam 1.

1303 Plant Design And Operation

53752 (CONF-8208148—, pp 176-177) **Hydroelectric development in Hawaii.** Broadbent, E.W. (Amfac Sugar Co., Honolulu, HI). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

Upgrading existing hydroelectric facilities in Hawaii via government tax incentives would provide a greater annual average amount of generation and help curb the problems of rising power costs. The history and future of hydroelectricity in the Islands are discussed.

53753 **(PB—83-162750) Automatic generation controller for Flatiron Dispatch Center-Laramie River Power station remote terminal unit.** Stitt, S.C.; Brown, G. (Bureau of Reclamation, Denver, CO (USA). Engineering and Research Center). Nov 1981. 106p. NTIS, PC E01/MF A01.

The operation and maintenance of the FAIC (Flatiron AGC Interim Controller) RTU's (remote terminal units) installed at Laramie River Powerplant is explained. These RTU's receive load control signals from the FAIC master station computer located at the Western Area Power Administration's Flatiron Dispatch Center. They perform the required control while sending status information back to the master.

53754 **(PB—83-163253) Ondergrondse pomp accumulatie centrale in nederland: vooronderzoek (Pumped Storage hydroelectric plants with underground reservoirs in the Netherlands: preliminary report).** (Technische Hogeschool Delft (Netherlands)). Dec 1980. 100p. NTIS, PC A05/MF A01.

The use of a pumped storage hydroelectric plant based on water power in the rural electricity net makes it possible to realize performance improvements and fuel savings in the existing plants. Because for an installation with above- and below-ground reservoirs which are controlled on the surface only a few locations are suitable in the Netherlands (gradient from 50 - 150 meters), in such a technique the reservoirs should be made as large as possible. In a design suitable for the Netherlands an underground pump hydroelectric storage plant (OPAC) should be possible by constructing a reservoir at a considerable depth underground. Such a plant could be built with a capacity from 500 to 1,200 MW in order to provide adequate support for the daily peak demands of the other electric power plants, whereby then it could be realized that expensive peak power could be produced cheaply.

1305 Economics And Management

REFER ALSO TO CITATION(S) 53752

1306 Environmental Aspects

53755 **(AD-A—126770/7) Effects of reservoir releases on water quality, macroinvertebrates, and fish in tailwaters: field study results. Final report.** Walburg, C.H.; Novotny, J.F.; Jacobs, K.E.; Swink, W.D. (Fish and Wildlife Service, Bowling Green, KY (USA). East Central Reservoir Investigations). Feb 1983. 186p. (WES-TR-E—83-6). NTIS, PC A09/MF A01.

This report summarizes field investigations conducted at seven reservoirs in 1979 and 1980 to determine the effect of reservoir releases on tailwater biota. The study sites differ greatly in project purpose, depth of water release from the reservoir, and location and are representative of many U.S. Army Corps of Engineers reservoirs throughout the United States. Studies were conducted in tailwaters below both flood-control and peaking hydropower projects. Effects of reservoir discharge were most evident near the dams where environmental stress was most severe; farther downstream the effect were moderated. The invertebrate and fish communities in tailwaters were affected most by the temperature, volume, and timing of the discharges. High levels of iron and manganese occurred in most tailwaters, but their effects on invertebrates and fish were not addresed in this study. The numbers of invertebrate and fish species were largest in tailwaters of flood-control projects with warmwater release and smallest in tailwaters of large hydropower projects.

53756 **(AD-A—126771/5) Techniques for reaeration of hydropower releases. Final report Oct 80-Apr 82.** Bohac, C.E.; Boyd, J.W.; Harshbarger, E.D.; Lewis, A.R. (Tennessee Valley Authority, Chattanooga (USA). Office of Natural Resources). Feb 1983. 171p. (WES-TR-E—83-5). NTIS, PC A08/MF A01.

Methods of aerating hydropower releases were reviewed based upon information from both published and unpublished sources. Techniques which aerated water as it passed through turbines and aeration techniques which were used in the reservoir itself to improve dissolved oxygen concentrations in the releases were the focal points of this review. Both American and European installations were investigated.

14 SOLAR ENERGY

1401 Resources And Availability

REFER ALSO TO CITATION(S) 54105

53757 **(PB—83-173096) Studies on parameterization of global, diffuse and direct solar radiation. Final report.** Kasten, F.; Dehne, K.; Golchert, H.J. (Commission of the European Communities, Luxembourg). [nd]. 210p. NTIS, PC E09/MF E09.

From 8 stations of the radiation network of Deutscher Wetterdienst, Federal Republic of Germany, the hourly sums of global radiation G measured during the 10 year period 1966-1975 were analyzed in terms of monthly cumulative frequency distributions of mean hourly irradiance above given thresholds. From the National Radiation Center Hamburg, additionally the data of diffuse solar radiation D, direct solar radiation I, atmospheric radiation A and several other derived radiation quantities were analyzed in the same way. Furthermore, monthly frequency distributions of global radiation of the 8 stations were established with respect to persistence through given numbers of consecutive hours and consecutive days, respectively, of irradiation above given thresholds.

53758 **(SERI/TP—254-2027) Graphical method for determining interflected daylight in clear climates.** Robbins, C.L.; Hunter, K.C. (Solar Energy Research Inst., Golden, CO (USA)). Jul 1983. Contract AC02-77CH00178. 7p. (CONF-830929—5). NTIS, PC A02/MF A01. Order Number DE83011989.

From 8. national passive solar conference; Santa Fe, NM, USA (5 Sep 1983).

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This report presents an extension of the daylight factor method of analysis that includes a graphical method for determining interflected light in clear climates. The interflected component of daylight, called the internal reflectance component (IRC), has been determined for overcast skies in research performed in the United Kingdom. The technique developed by the Building Research Establishment in the United Kingdom is based on determining an average IRC for a given room or space. Using a daylight availability model developed at SERI, a similar average IRC analysis technique is established for clear skies. The results of applying the SERI daylight availability model suggest that a critical element in determining the IRC under clear sky conditions is the ratio of global to diffuse (G/d) illuminance on a horizontal surface. This graphical technique for determining clear sky IRC values is expected to enhance the accuracy of daylighting system design by simplifying the format used in clear sky computation.

53759 **(SERI/TR—215-1824) Review of potential satellite techniques for mesoscale mapping of insolation.** Riordan, C.J.; Hulstrom, R.L. (Solar Energy Research Inst., Golden, CO (USA)). Jun 1983. Contract AC02-77CH00178. 30p. NTIS, PC A03/MF A01. Order Number DE83011998.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This report reviews techniques for characterizing mesoscale insolation variations using satellite-derived data on cloud cover.

Representative statistical and physical models that incorporate satellite data are described. Reported accuracies of the models indicate the feasibility of using satellite techniques, but practicality has yet to be demonstrated. Issues to be resolved include cost and accessibility of high-volume satellite data, cost and accuracy of data preprocessing, and accuracy of models under various amounts of cloud cover. Use of a simple clear-sky model with a satellite-derived cloud cover modifier is recommended.

1403 Economics

REFER ALSO TO CITATION(S) 53791

53760 **(PB—83-174185) Domestic potential of solar and other renewable energy sources. Supporting paper 6.** (National Academy of Sciences - National Research Council, Washington, DC (USA)). 1979. 105p. NTIS, PC A06/MF A01.

This is a study of the present and potential use in the United States of the renewable energy resources generally included under the term solar energy. In particular, the study attempts to estimate the likely energy costs and potential market penetrations of solar technologies under a variety of assumptions in order to allow for the inclusion of solar energy contributions in national energy models for the U.S. These estimates include base scenarios in which national policy dictates more rapid development of solar technologies. The group was not asked to assess the overall feasibility or consequences of these scenarios.

53761 **(SAND—83-1283) Effects of future energy scenarios on photovoltaic energy value.** Bonk, G.J.; Jones, G.J.; Thomas, M.G. (Sandia National Labs., Albuquerque, NM (USA); General Electric Co., Schenectady, NY (USA). Electric Utility Systems Engineering Dept.). Aug 1983. Contract AC04-76DP00789. 96p. NTIS, PC A05/MF A01. Order Number DE83017883.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The value of photovoltaic energy to the electric utility has been evaluated on a regional basis for a number of future energy supply scenarios. The continental US was divided into nine regional utilities based on the NERC regions, with modifications for fuel mix. Photovoltaic systems were slowly phased into each region starting in 1986 and reaching five percent of peak load by 2001. Utility avoided cost was calculated using General Electric's Optimized Generation Planning (OGP) computer model. Results show that photovoltaic energy value was determined by the highest marginal cost fuel in the region in use during PV output. Only future scenarios affecting this marginal cost affected PV value. In regions where this high marginal cost fuel was oil or natural gas, it was found that the worth of PV systems was decreased if they claimed capacity displacement. The southwestern US, New England, the Mid-Atlantic States, and the Texas/Oklahoma region were found to offer the highest PV value.

1404 Environmental, Legal, And Institutional Aspects

REFER ALSO TO CITATION(S) 53788, 53798, 54109

53762 (CONF-8208148—, pp 247-249) **Tax credits claimed by Hawaii residents.** Freitas, G. (State of Hawaii, Dept. of Taxation, Honolulu). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

Figures and percentages are given that reflect the tax credits claimed by Hawaii residents from 1977 to 1981. The bulk of the information is related to credits made available by 1977's Solar Energy Device Tax Credit.

53763 **(PB—83-170597) Preliminary assessment of the use of heat transfer fluids for solar thermal energy systems. Final report May 81-Apr 82.** Petty, S.E.; Garrett-Price, B.A.; McKown, G.L. (Battelle-Northwest, Richland, WA (USA). Pacific Northwest Lab.). Feb 1983. 75p. NTIS, PC A04/MF A01.

The report contains a preliminary assessment, based on available data, of the extent to which various materials will be used as heat transfer media in solar energy systems and of mechanisms for their release to the environment. The emphasis is on solar thermal energy systems for industrial, agricultural and electrical production applications over the next 5-10 years. The study provides an assessment of consequences associated with transport and fate of the materials in the environment; identifies available pollution control techniques; and cites areas where further research may be required.

1405 Solar Energy Conversion

REFER ALSO TO CITATION(S) 53735, 53736, 53736, 53741, 53743, 53744, 54160, 54290, 54340, 54979

53764 **(CONF-830109—3) Semiconductor processing with excimer lasers.** Young, R.T.; Narayan, J.; Christie, W.H.; van der Leeden, G.A.; Rothe, D.E.; Cheng, L.J. (Helionetics, Inc., San Diego, CA (USA). Laser Div.; Oak Ridge National Lab., TN (USA); Jet Propulsion Lab., Pasadena, CA (USA)). Jan 1983. Contract W-7405-ENG-26. 14p. NTIS, PC A02/MF A01. Order Number DE83007509.

From Topical meeting on optical techniques for remote probing of the atmosphere; Incline Village, NV, USA (10 Jan 1983).

The advantages of pulsed excimer lasers for semiconductor processing are reviewed. Extensive comparisons of the quality of annealing of ion-implanted Si obtained with XeCl and ruby lasers have been made. The results indicate that irrespective of the large differences in the optical properties of Si at uv and visible wavelengths, the efficiency of usage of the incident energy for annealing is comparable for the two lasers. However, because of the excellent optical beam quality, the XeCl laser can provide superior control of the surface melting and the resulting junction depth. Furthermore, the concentrations of electrically active point defects in the XeCl laser annealed region are 2 to 3 orders of magnitude lower than that obtained from ruby or Nd:YAG lasers. All these results seem to suggest that XeCl lasers should be suitable for fabricating not only solar cells but also the more advanced device structures required for VLSI or VHSIC applications.

53765 (CONF-8208148—, pp 157-166) **Biomass-energy development in the sugar industry.** Bouvet, P.E. (TheoDavies Hamakua Sugar Co., Paauilo, HI). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

The sugar-cane industry has long practiced a cogeneration cycle by producing bagasse from sugar-cane waste products to use as fuel to generate steam to drive the processing machines. Topics discussed include the importance of biomass fuel for the sugar industry, the status of biomass energy production by the sugar industry, bagasse drying, supply, and densification, and decreasing steam usage and increasing bagasse surplus.

53766 (CONF-8208148—, pp 167-172) **Eucalyptus plantations for energy production in Hawaii.** Crabb, T.B. (BioEnergy Development Corp., Hilo, HI). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

Hawaii's most-promising source of additional biomass fuel besides bagasse is wood fiber from Eucalyptus trees. BioEnergy Development Corporation was developed by DOE and C. Brewer and Co. in 1978 to demonstrate the feasibility of developing Eucalyptus plantations for energy production in Hawaii. Various aspects of the demonstration project are discussed.

53767 (CONF-8208148—, pp 173-175) **Molokai Biomass Project.** Urauchi, J.N. (Molokai Electric Co., Kaunakakai, HI). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

Details of the Molokai Biomass Project are discussed, including the reasons for its start-up, its site specifications and advantages, the plant design characteristics, and early operation results. Plans for the future are also mentioned.

53768 (CONF-8208148—, pp 205-213) **Liquid-fuel research in Hawaii.** Antal, M.J. Jr. (Hawaii Natural Energy Inst., Honolulu). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

The use of Hawaiian biomass as a source of fluid fuels for the state is the focus of the paper. Hawaii's low per-capital energy consumption permits biomass to meet a large fraction of the state's energy demand despite Hawaii's relatively high population density. The three methods of converting biomass to liquid and gaseous fuels - fermentation, gasification, and pyrolysis - are compared and contrasted. The conclusion is reached that, with efficient thermochemical processing of biomass, the state's demand for fuel in the vehicular transportation sector, or 42% of the state's total fluid fuel demand, could be satisfied. These projections are critically dependent on the productivity of the state's forests and the availability of wood resources. 11 references, 6 tables.

53769 (CONF-8208148—, pp 214-228) **Integrated liquid-fuel production.** Becker, J.C. Jr. (Jet Propulsion Lab., Pasadena, CA). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

The Jet Propulsion Laboratory of Pasadena, CA explains its recommendations for building a pilot plant for producing fuels or fuel extenders in Hawaii. The biomass-conversion process will ultimately be able to rely on solar-thermal energy from dishes as the energy source. The value of butanol and furfural production is explained. 11 figures.

53770 (DOE/ER/10000—T1) **Development of a solar-energy system. First annual report.** Johnson, E.L. (Texas Instruments, Inc., Dallas (USA). Central Research Lab.). 19 Jun 1980. Contract FC01-79ER10000. 325p. NTIS, PC A14/MF A01. Order Number DE83017376.

Portions are illegible in microfiche products.

The concept reported involves solar energy conversion by operation of small silicon solar cells immersed in an electrolyte, e.g., HBr. The current generated by the cells is used to separate the electrolyte into its constituent parts, which can be stored separately until needed and then recombined in a fuel cell to produce electrical energy. Separate photovoltaic elements, somewhat spherical, are fixed in a glass matrix, electrically interconnected, and immersed in the electrolyte. The spherical solar cells are of both n-on-p and p-on-n types. The array is so designed that short or open circuit cells are not fatal to its operation. The status and plans for component and system development are discussed in detail. (LEW)

53771 (DOE/ER/13019—1) **Zone-melting recrystallization for solar cells. Annual progress report, September 1, 1982-August 31, 1983.** Smith, H.I. (Massachusetts Inst. of Tech., Cambridge (USA)). 31 Aug 1983. Contract AC02-82ER13019. 39p. NTIS, PC A03/MF A01. Order Number DE83017851.

Portions are illegible in microfiche products.

Zone-melting recrystallization (ZMR) of Si on SiO_2 is investigated to determine if this process can be adpated to produce material configurations suitable for low-cost, high-efficiency photovoltaic cells. Fundamental recrystallization mechanisms, crystallographic characteristics and electrical properties are studied. Novel means of controlling crystallographic properties have been developed, including: hourglass, vertical-constriction, entrainment, and orientation-filtering techniques. EBIC studies indicated enhanced dopant diffusion along grain boundaries and subboundaries, and showed that the diffusion length of minority carriers is $\sim$ 100 μm. DLTS studies showed that ZMR films do not contain deep levels associated with impurities, and have interface-state densities comparable to IC-grade Si wafers. A (100) crystallographic texture can be achieved in 50 μm-thick ZMR Si films using the vertical-constriction technique. Such films can provide a double pass of incident light and should be suitable for high-efficiency photovoltaic cells. Both two-sided and back-contact cells have been fabricated. We intend to develop a process in which thick Si films are recrystallized directly on the windows of photovoltaic modules. This should lead to considerable economy.

53772 (DOE/ET/20587—T1) **Application of sugar maple and black locust to the biomass/energy-plantation concept. Annual report, March 1, 1981-February 28, 1982.** Sajdak, R.L. (Michigan Technological Univ., Houghton (USA). Dept. of Forestry). 1 Mar 1982. Contract FG01-78ET20587. 52p. NTIS, PC A04/MF A01. Order Number DE83017193.

The purpose of this research program is to determine the feasibility of converting existing pole-size maple stands to biomass/energy plantations using black locust as an interplanted species. Methods to quantify biomass production in northern hardwood stands have been refined and additional sites have been sampled. Hardwood sprout biomass production was shown to be greatly affected by site, fertilizer treatment, and tree species. Screening of black locust Rhizobium strains for acid tolerance has been completed. Seven strains have been found to be tolerant of both high aluminum and low pH conditions. A greenhouse and outplanting study testing the competitiveness and nitrogen-fixing ability of these strains under forest conditions has begun. Second year results of black locust provenance testing has shown frost hardiness variation among trees to be greater than among sources. Consequently, present work is now concentrated on propagating northern locust sources vegetatively. Biomass characterization of young northern hardwood sprouts by chemical and thermal analysis is complete.

53773 (DOE/ET/23074—T2) **Woody biomass production through solar energy conversion. Annual report, 1980-1981.** (Illinois Univ., Urbana (USA). Dept. of Forestry). 1 Mar 1981. Contract FG01-78ET23074. 87p. NTIS MF A01. Order Number DE83016437.

Microfiche only, copy does not permit paper copy reproduction.

Woody biomass production on marginal lands in Illinois has been studied for the past three years of a long-term research project involving development of a woody biomass production system for the private landowner. More than one million acres of marginal land in small ownerships are potentially available for biomass production in Illinois alone. Results of the study to date include preliminary information on silvicultural techniques for establishment of woody biomass plantations including species, spacing and rotation, as well as planting, irrigation, herbicides, and harvest. These data are very tentative at this time, but completion of the study will allow specific recommendations including a silvicultural system for woody biomass production with positive energy and economic balances.

53774 (DOE/ET/23089—T2) **Technical and economic assessment of liquid-fuel production from biomass. Final research report.** Wan, E.I.; Price, J.D. (Science Applications, Inc., McLean, VA (USA)). 12 Jul 1982. Contract AC01-78ET23089. 292p. NTIS, PC A13/MF A01. Order Number DE83018239.

Portions are illegible in microfiche products.

The following topics are discussed: technical and economic assessment of methanol production from biomass, overview of thermochemical production of liquid fuels from biomass, evaluation of advanced biomass gasification processes, analysis of advanced gasification data for liquid fuel synthesis, biomass-to-liquid fuel system modeling and analysis, integrated conceptual process plant design, economic analysis of methanol production from biomass, and comparison of methanol production from biomass with other emerging synfuel production routes. (MHR)

53775 **(DOE/JPL/954929—83/10) Investigation of accelerated stress factors and failure/degradation mechanisms in terrestrial solar cells. Fourth annual report.** Lathrop, J.W. (Clemson Univ., SC (USA). Dept. of Electrical and Computer Engineering). Oct 1983. Contract NAS-7-100-954929. 120p. NTIS, PC A06/MF A01. Order Number DE84000032.

This annual report presents results of an ongoing research program into the reliability of terrestrial solar cells. Laboratory accelerated testing procedures are used to identify failure/degradation modes which are then related to basic physical, chemical, and metallurgical phenomena. In the most recent tests, ten different types of production cells, both with and without encapsulation, from eight different manufacturers were subjected to a variety of accelerated tests. Results indicated the presence of a number of hitherto undetected failure mechanisms, including Schottky-barrier formation at back contacts and loss of adhesion of grid metallization. The mechanism of Schottky-barrier formation can be explained by hydrogen, formed by the dissociation of water molecules at the contact surface, diffusing to the metal/semiconductor interface. This same mechanism can account for the surprising increase in sensitivity to accelerated stress conditions that was observed in some cells when encapsulated.

53776 **(DOE/JPL/956133—83-1) Preliminary study of a radiantly heated fluidized bed for the production of high-purity silicon.** Levenspiel, O.; Larson, M.; Zhang, G.T.; Ouyang, F. (Oregon State Univ., Corvallis (USA)). Aug 1983. Contract NAS-7-100-956133. 44p. NTIS, PC A02/MF A01. Order Number DE83016569.

The purpose of the reported research is to explore a processing method for decomposing silane. The process involves heating the particles at the surface of a shallow fluidized bed by radiant heaters located above the surface of the bed. The radiant sources could be cooled by a purge of inert gas which is exhausted with the spent H_2. The hot bed particles would circulate down to the bottom of the bed where they would heat the cold silane gas rising through the distributor plate. Decomposition and deposition of the silane then follow. Two important systems characteristics are evaluated. One, the effective absorptivity of the bed, is the fraction of electrical energy supplied to the heaters which is actually absorbed by the particles. The second is the heat transfer coefficient between the hot bed and the cool distributor plate. Both characteristics are experimentally studied and theoretically examined. (LEW)

53777 **(DOE/JPL/956254—1) Photovoltaic-module bypass-diode encapsulation. Annual report.** (General Electric Co., Philadelphia, PA (USA). Advanced Energy Programs Dept.). 20 Jun 1983. Contract NAS-7-100-956254. 149p. NTIS, PC A08/MF A01. Order Number DE83016993.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The design and processing techniques necessary to incorporate bypass diodes within the module encapsulant are presented in this annual report. A comprehensive survey of available pad-mounted PN junction and Schottky diodes led to the selection of Semicon PN junction diode cells for this application. Diode junction-to-heat spreader thermal resistance measurements, performed on a variety of mounted diode chip types and sizes, have yielded values which are consistently below 1°C per watt, but show some instability when thermally cycled over the temperature range from -40 to 150°C. Based on the results of a detailed thermal analysis, which covered the range of bypass currents from 2 to 20 amperes, three representative experimental modules, each incorporating integral bypass diode/heat spreader assemblies of various sizes, were designed and fabricated. Thermal testing of these modules has enabled the formation of a recommended heat spreader plate sizing relationship. The production cost of three encapsulated bypass diode/heat spreader assemblies were compared with similarly rated externally-mounted packaged diodes. An assessment of bypass diode reliability, which relies heavily on rectifying diode failure rate data, leads to the general conclusion that, when proper designed and installed, these devices will improve the overall reliability of a terrestrial array over a 20 year design lifetime.

53778 **(MTR—80W00022) Utility Applications and Synthetic Fuels and Chemicals Market Sector: workbook.** Miller, C.G.; deJong, D.L. (USDOE Technical Information Center, Oak Ridge, TN). Jan 1980. Contract AC01-78CS35147. 112p. NTIS, PC A06. Order Number DE83017761.

Paper copy only, copy does not permit microfiche production.

This workbook summarizes the preliminary data and assumptions of the Utility Applications and Synthetic Fuels and Chemical Market Sectors prepared in conjunction with the development of inputs for a National Plan for the Accelerated Commercialization of Solar Energy.

53779 **(PB—83-221713) Aquaculture techniques: a production forecasting model for aquaculture systems. Technical completion report.** Downey, P.C.; Klontz, G.W. (Idaho Univ., Moscow (USA). Idaho Water and Energy Resources Research Inst.). Mar 1983. 82p. NTIS, PC A05/MF A01.

Computer implementation of the mathematical models of quantitative relationships in aquaculture systems is a dynamic process which provides a conceptual framework for understanding systems behavior. These models can provide useful information on variable significance to systems functioning. This computer-implemented mathematical model addresses one of the significant limitations of aquaculture systems management, namely, production forecasting, by providing a method of using current technology to predict Allowable Growth Rate (AGR).

53780 **(PB—83-224378) Photovoltaic conversion of solar energy.** Pezuela, P.; Ruedo, F. (Centro para el Desarrollo Tecnologico Industrial, Madrid (Spain)). Apr 1981. 77p. NTIS, PC A05/MF A01.

The volume outlines the principles, techniques, and possibilities of solar energy use through photovoltaic conversion, and also develops a strategy for the future, which may help to improve Spain's energy situation. The document covers the main components of a photovoltaic system, cells and panels, energy storage, batteries, remote uses, cost problems, marketing possibilities, solar energy activities in other countries, and the future of solar energy. The annex includes techniques of materials production; thin film crystalline and amorphous cells; monocrystalline, polycrystalline, and metallurgical silicone cells; CdS/Cu_2S cells; concentrators; and the availability of silicon.

53781 **(PB—83-225144) Genetic engineering in biotechnology.** Bedate, C.A.; Morales, J.C.; Lopez, E.H. (Centro para el Desarrollo Tecnologico Industrial, Madrid (Spain)). Sep 1981. 79p. NTIS, PC A05/MF A01.

The objective of this book is to encourage the use of genetic engineering for economic development. The report covers: (1) Precedents of genetic engineering; (2) a brief description of the technology, including the transfer of DNA in bacteria (vectors, E. coli and B. subtilis hosts, stages, and technical problems), practical examples of techniques used and their products (interferon; growth hormone; insulin; treatment of blood cells, Talasemia, and Lesch-Nyhan syndrome; and more nutritious soya), transfer to higher organisms, and cellular fusion; (3) biological risks and precautions; (4) possible applications (production of hydrogen, hydrocarbons, alcohol, chemicals, enzymes, peptides, viral antigens, monoclonal antibodies, genes, proteins, and insecticides; metal extraction; nitrogen fixation; biodegradation; and new varieties of plants and animals; and (5) international activities.

53782 **(SERI/TP—611-1241) Advances in photovoltaics R and D: an overview.** Kazmerski, L.L. (Solar Energy Research Inst., Golden, CO (USA)). May 1981. Contract AC02-77CH00178. 7p. (CONF-810812—60). NTIS, PC A02/MF A01. Order Number DE83003711.

From 16. intersociety energy conversion engineering conference (IECEC); Atlanta, GA, USA (9 Aug 1981).

Portions are illegible in microfiche products.

A summary status of the advanced photovoltaics research and development is presented. These technologies cover two broad areas: (1) Thin-film intermediate efficiency (> 10%) solar cells for

flat-plate applications, and (2) Single-crystal, high-efficiency (> 30%) solar cells for concentrators. Major progress is highlighted for polycrystalline and amorphous silicon, cadmium sulfide, gallium arsenide, emerging materials, and spectrum-splitting and multiple junction concentrators.

53783 **Direct mass-spectrometric studies of the pyrolysis of carbonaceous fuels. II. Qualitative observations of primary and secondary processes in biomass.** Milne, T.A.; Soltys, M.N. (Solar Energy Research Inst., Golden, CO). *Journal of Analytical and Applied Pyrolysis;* 5: No. 2, 111-131(Jul 1983).

Initial, qualitative results for the primary and secondary pyrolysis of biomass and related compounds are shown, using the flame-pyrolysis direct free-jet molecular-beam mass-spectrometric sampling system described in Part I. Time-resolved pyrolysis data are shown for wood. Integrated primary pyrolysis spectra are shown for cellulose, lignin, wood, oil shale, coal, and polyethylene specimens, flash-heated in 1-atm 900°C steam-argon. Our spectra for cellulose and lignin are compared with several reported in the literature using analytical pyrolysis and other techniques. Secondary cracking spectra of ethane, n-butane and cellulose are shown illustrating the ability of this technique to separate primary from secondary processes. Finally, the present technique is compared with more conventional analytical pyrolysis-mass spectrometry approaches. 21 figures.

53784 **Electrochemical characterization of p-type semiconducting tungsten disulfide photocathodes: efficient photoreduction processes at semiconductor/liquid electrolyte interfaces.** Bagilo, J.A.; Calabrese, G.S.; Harrison, D.J.; Kamieniecki, E.; Ricco, A.J.; Wrighton, M.S.; Zoski, G.D. *Journal of the American Chemical Society;* 105: No. 8, 2246-2256(20 Apr 1983).

Single-crystal p-type WS_2(E/sub g/ $\approx$ 1.3 eV) has been synthesized and characterized as an electrode material in CH_3CN/0.1 M [n-Bu_4N]ClO_4 and in aqueous electrolytes containing a variety of one-electron redox reagents having different E/sub 1/2/ values. In either CH_3CN or H_2O solvent the flat-band potential, E/sub FB/, is measured to be $\sim$ + 0.95 vs SCE. In aqueous I_3^-/I^- the E/sub FB/ is shifted more negatively by at least 0.3 V as is found for n-type WS_2 photoanodes. Capacitance measurements of the WS_2/electrolyte interface to determine E/sub FB/ accord well with electrochemical measurements. For E/sub 1/2/ more negative than E/sub FB/ the p-type WS_2 behaves as a photocathode giving an open-circuit photovoltage, E/sub v/(oc), up to $\sim$ 0.8 V depending on E/sub 1/2/. For E/sub 1/2/ between +1.3 and -0.1 V vs SCE, E/sub v/(oc) varies as expected: for E/sub 1/2/ more positive than E/sub FB/ the p-type WS_2 behaves as a metallic electrode while for E/sub 1/2/ more negative than E/sub FB/ we find E/sub v/(oc) $\approx$ vertical bar E/sub 1/2/ - E/sub FB/ vertical bar. It appears that for negative redox couples carrier inversion results at the p-WS_2 surface, but for E/sub 1/2/ more negative than -0.1 V vs SCE E/sub v/(oc) declines, a result associated with junction breakdown at sufficiently negative potentials. p-Type WS_2-based photoelectrochemical cells can be used to effect the sustained conversion of visible light (632.8 nm) to electricity in H_2O or CH_3CN with efficiencies of up to $\sim$ 7%. In H_2O the photochemical reduction to H_2 can be effected by illumination of p-type WS_2 modified by depositing $\sim 10^{-7}$ mol/cm^2 of Pd(0) or Pt(0) onto the surface as an H_2 evolution catalyst. Efficiency for H_2 evolution from 6 M H_2SO_4 is typically 6 to 7% for 632.8 nm (50 mW/cm^2) intensity.

53785 **Junction geometry in Cu_2S/CdS or Cu_2S/Cdsub(1-x)Znsub(x)S solar cells prepared by the solution reaction method.** Eser, E. *Solar Cells;* 8: No. 2, 157-168(Mar 1983).

A quantitative theoretical model is proposed to describe the junction geometry of Cu_2S/CdS or Cu_2S/Cdsub(1-x)Znsub(x)S solar cells prepared by the solution reaction process. All the parameters of the model are experimentally assessable. To a good approximation, Cu_2S penetrations into the CdS or Cdsub(1-x)Znsub(x)S grain boundaries are triangular in cross section. Both the size of the penetrations and the midgrain Cu_2S thickness can show important local variations. Averages of these quantities are determined for the Cu_2S/CdS case using the present model. These values are then used to estimate their effect on the cell parameters. An identical analysis can be applied to the Cu_2S/Cdsub(1-x)Znsub(x)S solar cells.

53786 **Semiconductor liquid-junction solar cell.** Parkinson, B.A. US Patent Application 6-437,784. 29 Oct 1982. 12p. Contract AC02-77CH00178.

A semiconductor liquid junction photocell in which the photocell is in the configuration of a light concentrator and in which the electrolytic solution both conducts current and facilitates the concentration of incident solar radiation onto the semiconductor. The photocell may be in the configuration of a non-imaging concentrator such as a compound parabolic concentrator, or an imaging concentrator such as a lens.

53787 **Compensated amorphous-silicon solar cell.** Devaud, G. US Patent Application 6-390,730. 21 Jun 1982. 20p. Contract AC02-77CH00178.

An amorphous silicon solar cell including an electrically conductive substrate, a layer of glow discharge deposited hydrogenated amorphous silicon having regions of differing conductivity with at least one region of intrinsic hydrogenated amorphous silicon. The layer of hydrogenated amorphous silicon has opposed first and second major surfaces where the first major surface contacts the elecrically conductive substrate and an electrode for electrically contacting the second major surface. The intrinsic hydrogenated amorphous silicon region is deposited in a glow discharge with an atmosphere which includes not less than about 0.02 atom percent mono-atomic boron. An improved N.I.P. solar cell is disclosed using a BF_3 doped intrinsic layer.

1406 Photovoltaic Power Systems

REFER ALSO TO CITATION(S) 53761, 53780

53788 **(BNL—51599) Health and environmental effects document for photovoltaic energy systems, 1982.** Moskowitz, P.D.; Barancik, J.I.; Coveney, E.A.; Hamilton, L.D.; Perry, P.E.; Rabinowitz, S.; Rowe, M.D.; Wilenitz, I. (Brookhaven National Lab., Upton, NY (USA)). Sep 1982. Contract AC02-76CH00016. 76p. NTIS, PC A05/MF A01. Order Number DE83017827.

This report examines health and environmental risks associated with the fabrication and application of five photovoltaic energy systems. Detailed process-level analysis of fabrication alternatives suggests that most potential waste streams can be controlled with available technology. Only fluorine and cadmium compounds are likely to cause serious disposal problems. Occupational risks from accidental injuries are quantified and illness-related effects are examined. Although significant illness-related effects are not expected, potential chemical and physical hazards found in the workplace merit careful consideration. Public health risks from pollutants emitted throughout the energy cycle and physical hazards associated with rooftop applications are reviewed. The risks from pollutants seem to be larger, but they are highly uncertain. Risks to individuals from electric shock and fire may be significant, but societal risks are probably small. Environmental hazards arise principally from food-chain mobility of selected chemicals and direct physical disruption associated with large central-station applications. Research needed to reduce uncertainties in risk assessment include examination of new materials and processes, and measurement of public/occupational exposure to hazardous chemical and physical environments.

53789 (CONF-8208148—, pp 197-201) **Solar-photovoltaic energy system for the G.N. Wilcox Memorial Hospital and Health Care Center.** Seki, A.S. (Hawaii Natural Energy Inst., Honolulu). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

Available sunlight is now helping the 165-bed, 156,000-ft^2 G.N. Wilcox Memorial Hospital of Lihue, Kauai to meet its energy needs with the world's first parabolic concentrator photovoltaic/thermal solar system. The hospital's average electrical load is 2.8 million kWh/y with air conditioning demanding 60% of the load. The 35-kW solar system is capable of producing 22,000 net kWh, but has only been operating at an efficiency of 50% of calculated values. 620,000 gallons of 180°F hot water annually will help meet

the hospital's needs of 500 million Btu per year of hot water. The problems to date that have affected the project and its performance include foul weather, power-conditioning-unit failures, on-site data-acquisition-system malfunctions, and photovoltaic-receiver cell damage. 6 references, 2 figures.

53790 **(DOE/ET/20279—240) Development and evaluation of solar-photovoltaic systems. Final report.** Kern, E.C. Jr.; Pope, M.D. (Massachusetts Inst. of Tech., Lexington (USA). Lincoln Lab.). Jun 1983. Contract AC02-76ET20279. 352p. NTIS, PC A16/MF A01. Order Number DE83017776.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Design, construction, and evaluation of photovoltaic (PV) systems for use in agriculture (at Mead, Nebraska), for a museum display (at the Chicago Museum of Science and Industry), for operating a commercial radio station (at Bryan, Ohio), and for powering a remote site where utility hookup is not available (at Natural Bridges, Utah) is discussed. The work reported also evaluated the field performance of PV arrays at those sites as well as at over 15 additional locations, where either small PV arrays were located or residential PV systems were installed. Results of array evaluations are presented. The work in developing instrumentation for PV system performance is discussed. Two instruments were developed: a pyrheliometer for monitoring insolation at a field site, and a portable unit for determining the current-voltage characteristics of a PV module or array in the field. System engineering, technology development, and system evaluation for residential PV systems are discussed. (LEW)

1407 Solar Thermal Power Systems

REFER ALSO TO CITATION(S) 53763, 53825, 53826

53791 **(DOE/CS/35147—T1) Repowering with solar energy.** Curto, P. (Mitre Corp., McLean, VA (USA). METREK Div.). Mar 1979. Contract AC01-78CS35147. 33p. NTIS, PC A03/MF A01. Order Number DE83016950.

During the transition phase between today's fossil fuel-based energy markets in the US and the ultimate condition of widespread use of renewable resources, solar energy utilization will become commercialized. One of the more-efficient means to use solar energy is based on direct solar thermal conversion. Since sunlight is a diffuse energy source, the more efficiently it is converted to useful form, the less hardware is needed. Since sunlight is inherently intermittent in nature, providing a useful output that is predictable and steady requires the use of some form of storage - thermal, electric, mechanical, chemical, magnetic or in stored fuel. Further, since there exists a large number of fossil-fuel burning installations and a well-established fuel-distribution system to supply them, the initial use of solar energy will likely be in a repowering mode - retrofit hybrids as fuel savers. This is the fundamental basis for solar-thermal repowering.

53792 **(SERI/TR—253-1868) Conceptual design of a 20-acre salt-gradient solar pond system for electric power production at Truscott, Texas.** May, E.K.; Leboeuf, C.M.; Waddington, D. (Solar Energy Research Inst., Golden, CO (USA)). Jul 1983. Contract AC02-77CH00178. 37p. NTIS, PC A03/MF A01. Order Number DE83011999.

This report documents the final phase of a study performed for the US Army Corps of Engineers, Tulsa District regarding the technical feasibility of solar pond technology to produce electricity using part of a brine containment lake at Truscott, Texas. A conceptual design of an 8-ha (20-acre) solar pond electric system is described, including the layout and design of the solar, cooling, and evaporating ponds; the preliminary specifications of mechanical equipment (pumps, piping, heat exchangers, and turbine/generator) and instrumentation; and operational and maintenance procedures. According to the ground rules established by the Corps of Engineers, the solar pond system was to provide at least enough energy to meet the annual energy requirements of Area VIII Pump Station (1.6 GWh) at a 15% capacity factor. Design net annual system output is 1.9 GWh. Gross power output from the generator varies from 1470 kW in April to 1980 kW in November for an average of about 1730 kW. Parasitic power consumed for pumping averages about 300 kW. A major effort was undertaken to minimize system capital costs. Estimated initial cost of the 2-MW peaking system is $5,700,000. Due to the low system capacity factor, the mechanical equipment is the major cost constituent.

53793 **Heating system for a solar receiver.** Lepoultel, D. (to Constructions Navales et Industrielles de la Mediterranee, 75 - Paris (France)). French Patent 2,509,444/A/. 14 Jan 1983. 7p. (In French).

FR PAT-APPL-8113306.

This invention concerns a heating system for a solar receiver of the single phase coolant fluid type, heated by the rays of the sun reflected by a field of heliostats. It comprises a receiver composed of a cavity whose surface is either cylindrical or prismatic, having an open front located in the field of heliostats and side and rear walls lined with pipes through which the coolant flows. This system features a radiant heating system to heat the inside walls of the receiver by radiation.

1408 Ocean Thermal Gradient And Salinity Gradient Power Systems

REFER ALSO TO CITATION(S) 54209

53794 **(CONF-830851—1) Enhanced test facility for OTEC at Keahole Point.** Hillis, D.L.; Stevens, H.C.; Panchal, C.B. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 3p. NTIS, PC A02/MF A01. Order Number DE83017962.

From OCEANS '83 - effective use of the sea--an update; San Francisco, CA, USA (29 Aug 1983).

Additional test facilities are being planned for Keahole Point, Hawaii, that would greatly increase the amounts of warm and cold water available for OTEC research and development. Present activities include the design of seawater systems and a pumping station, using the existing OTEC-1 cold-water pipe and pumps. Future options include the installation of available heat exchangers and ammonia-system equipment, the addition of a turbine generator, and facilities for open- and closed-cycle testing of components and systems.

53795 (CONF-8208148—, pp 178-181) **Tower-based OTEC design for Hawaii.** Lessard, D. (General Electric Co., Schenectady, NY). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

A conceptual design for a 40-MWe OTEC-I (ocean thermal energy conversion) Pilot Plant is Hawaii's first step in implementing the US Ocean Thermal Energy Act of 1980. General Electric has been chosen to assemble and evaluate the potential of the Conceptual Design. The specifics of the project are discussed, and the main issues to be considered in the development are stated to be reliability, environmental impacts, and economics.

53796 (CONF-8208148—, pp 182-196) **OTEC power for Hawaii.** Yaffo, J.E. (Ocean Thermal Corp., New York, NY). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

The DOE-sponsored 40-MWe OTEC (ocean thermal energy conversion) Pilot Plant situated on Oahu, Hawaii, at the Kahe power plant is described. The baseline concept is described in terms of its power system, ocean system, and predicted plant performance. 3 references, 16 figures.

53797 (CONF-8208148—, pp 242-246) **Development of ocean thermal energy conversion.** Craven, J.P. (Univ. of Hawaii, Manoa). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

Ocean Thermal Energy Conversion (OTEC) produces energy by capitalizing on the temperature differences between upper and lower layers of the ocean. OTEC has the potential to reduce the US dependence on foreign oil and to reduce atmospher-

ic carbon dioxide levels, but its economic feasibility must first be proven. The empirical evidence gained at OTEC-I in 1979 off Keahole Point, Hawaii is discussed. 10 references.

53798 **(PB—83-228676) Permits and regulations applicable to United States ocean thermal energy conversion projects.** (National Oceanic and Atmospheric Administration, Washington, DC (USA). Office of Ocean Minerals and Energy). Apr 1982. 227p. NTIS, PC A11/MF A01.

This guide, covering permits and regulations applicable to U.S. OTEC projects, is another step in NOAA's process of providing the tools needed for OTEC project sponsors to design, develop, and implement commercial OTEC operations in the most efficient and cost-effective way. Its purpose is to provide OTEC project sponsors with an overview of potentially required licenses, permits, and authorizations, at both the Federal and State level, to give guidance on information about the proposed project needed to determine what permits are required, and to list, in a single reference, the agencies potentially involved in project review.

1409 Solar Thermal Utilization

REFER ALSO TO CITATION(S) 53822, 53822, 53823, 54070, 54138

53799 **(AD-A—124900/2) Simulation of a passive solar energy system. Master's thesis.** Slate, M.P. (Air Force Inst. of Tech., Wright-Patterson AFB, OH (USA). School of Engineering). Dec 1982. 114p. NTIS, PC A06/MF A01.

A simple lumped capacitance-resistance model is used to simulate heat flow in a residential size structure heated passively by the sun. The model takes the form of an analogous electrical circuit. A computer program was written to analyse the circuit. By altering the input parameters of the program, the thermal performance of a wide variety of passive solar designs can be investigated for any geographical location. By comparing program generated data to data taken from experimental test cells in Los Alamos, New Mexico, it was found that the simulation program predicted energy use to within 4 percent of measured values. Also, the computer program predicted temperature swings to within 16 percent of measured swings. Correlation with empirical methods of calculating monthly and annual savings in fuel use for heating was poor. Using the simulation calculations as a base, the predictions of anual savings differed by as much as 76 percent.

53800 (CONF-8208148—, pp 76-79) **Solar hot-water heaters.** Watumull, R. (Natural Resources, Inc., Honolulu, HI). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

Solar water heating is the only practical, commercially available alternate energy technology in Hawaii. The history and the future of the solar industry are discussed. Three types of solar systems are explained: the pump type, the thermo-syphon type, and the photovoltaic systems. The emphasis on solar energy in Hawaii would be much greater if oil supplies were less dependable and/or more costly.

53801 **(DOE/CE/15095—3) Drying wood with the sun: how to build a solar-heated firewood dryer.** (National Center for Appropriate Technology, Butte, MT (USA)). Aug 1983. Contract AC01-82CE15095. 26p. NTIS, PC A03/MF A01. Order Number DE83018210.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Construction details are given for a solar-heated firewood dryer along with some helpful hints for the wood burner. Appendices list DOE Appropriate Technology small grants related to wood drying and wood burning.

53802 **(PB—83-165340) Integral solar water heaters in low income housing: a preliminary report on a research and development project.** (National Building Research Inst., Pretoria (South Africa)). [nd]. 10p. NTIS, PC A02/MF A01.

This type of solar water heater is simple to make and fit and has been specially developed for the low-income market. The project, which involves 166 houses, will also yield information on hot water consumption and user reaction to the new units. Because this data will be of national value the research will be coordinated by the National Energy Research Program of the CSIR. The report claims that the use of solar energy has the potential to improve the quality of life of all people, particularly those in the lower income groups, and adds that the results will probably contribute to future policy decisions relating to water heating and energy supply for low-income houses.

53803 **(PB—83-170936) Study and evaluation of the latent cooling potential of chemical de-humidifiers. Final report.** Campbell, J.; Lush, D.M.; Moss, J.G.G. (Commission of the European Communities, Luxembourg). [nd]. 92p. NTIS, PC E05/MF E05.

The study is concerned with the evaluation of a combination of low temperature solar energy collectors and two types of dehumidifier as parts of an air conditioning system, viz, the liquid spray type and the rotating matrix type, the absorbent being either a lithium halide, a glycol or silica gel. The performance of the solar collectors in UK summer conditions is analyzed and additional uses of solar collection capacity for domestic hot water service and mid-season heating are investigated. The design and selection of a method for testing the performance of solar powered dehumidifying systems using the various absorbents are discussed.

53804 **(PB—83-171009) Passive solar-heating retrofit of a maintenance facility: first-year performance. Research report may 81-jun 82.** Jackson, D.R.; Callahan, J.M. (Connecticut Dept. of Transportation, Wethersfield (USA). Bureau of Planning and Research). Sep 1982. 95p. NTIS, PC A05/MF A01.

A 12,000 sq. ft. maintenance facility in Connecticut has been retrofitted with a 1,500 sf passive-solar Trombe wall, 2 in. of foam roof insulation and a new control system that allows night/weekend temperature setback. Also a new separate boiler has been installed to heat an office/locker wing of the facility. An energy-consumption monitoring system was installed in January 1980 and has collected data for 1 1/2 years before the retrofit and one complete year after the retrofit. An engineering and economic analysis was performed and the results are presented along with recommendations. Actual energy consumption for the facility was very close to that predicted using simple analytic methods. Average oil consumption for the period 1973 to 1980 was 8206 gallon/year. After the solar wall was installed and other energy-conservation measures implemented the yearly oil consumption was reduced to 2744 gallons/year.

53805 **(PB—83-173062) Pilot test facility. phase I. Final report.** Hanitsch, R. (Commission of the European Communities, Luxembourg). [nd]. 63p. NTIS, PC E04/MF E04.

The aims of phase I of the PTF solar research project have been achieved; (1) design and commissioning of solar system 1 (SS1, reference installation), (2) first test runs of the reference installation, (3) recording of results of measurements in cassette form, and (4) design of solar system 2 (SS2).

53806 **(PB—83-173070) Presentation of the software for central control system I of the solar pilot test facilities. volume III. Final report.** (Commission of the European Communities, Luxembourg). [nd]. 72p. NTIS, PC E04/MF E04.

The complete computer program necessary for the pilot test facility (PTF) of a domestic solar heating system is divided into two parts, initiation and normal operation. Two types of initiation are recognized; initiation of physical values and initiation of variables of the programs. Initiations are applied both at first start-up and at restart after a momentary interruption.

53807 **(PB—83-173146) United kingdom solar pilot test facility. the design, construction and first phase of operation. Final report.** Potter, I.N.; Lawrance-Owen, P.N.; Booth, W.B. (Commission of the European Communities, Luxembourg). [nd]. 109p. NTIS, PC E06/MF E06.

The main objective of the pilot test facility (PTF) is to validate mathematical models for domestic solar space heating systems. The design and operation of the two solar heating systems currently incorporated into the United Kingdom PTF are detailed.

53808 **(PB—83-227223) Potential for salt-gradient solar ponds in New York State. Final report.** Eggert, R.J. (Urban Systems Research and Engineering, Inc., Cambridge, MA (USA)). Dec 1982. 227p. NTIS, PC A11/MF A01.

The report examines the technical and economic feasibility of salt-gradient solar ponds in New York, with preliminary design estimates and financial analyses performed for five specific sites in the State. The report critiques available solar radiation data and develops more reliable estimates for the State; calculates the potential output of New York State solar ponds; estimates the cost of ponds ranging in size from 1,600 square feet to 50 acres; and analyzes the financial feasibility of ponds for various applications in New York. Only low-temperature thermal applications -- space heating, domestic water heating, and process heat -- are considered.

53809 **(PB—83-227678) Feasibility of solar pond heating for northern cold climates.** Lund, P.D.; Routti, J.T. (Helsinki Univ. of Technology, Espoo (Finland). Dept. of Technical Physics). 29 Dec 1982. 45p. (TKK-F-A—491). NTIS, PC E04/MF E01.

A computational performance and feasibility study of the salt-gradient solar pond for residential heating in high-latitude and cold climates has been made using computer simulations with meteorological data characteristic to southern Finland (60 degrees N). Freezing, snow coverage and surface insulation for wintertime are also considered in the computations. For an individual house with 100 sq m living area, a solar pond of 3.5 m depth and 400 sq m area would provide a solar fraction of 50% without surface insulation and 75% with surface insulation. A large pond for district heating would require about one third of the pond area per house as compared with an individual house. A heat pump would still reduce the pond size requirement.

53810 **(PB—83-227801) Radiation transmission measurements for solar ponds.** Lund, P.D.; Keinonen, R.S. (Helsinki Univ. of Technology, Espoo (Finland). Dept. of Technical Physics). 4 Jan 1983. 18p. (TKK-F-A—498). NTIS, PC E03/MF E01.

Transmission spectra and extinction coefficients for different salt solutions have been measured. The effect of pond transparency on the performance of a district solar pond is also discussed.

53811 **(UT/CES-WP—6) Influence of residential solar water heaters on electric-utility peak demand.** Askey, J.; Vliet, G.C. (Texas Univ., Austin (USA). Center for Energy Studies). Jun 1983. 20p. NTIS, PC A02/MF A01. Order Number DE83910889.

The purpose of this investigation is to examine the effect on the peak and seasonal loads of an electric utility when conventional electric water heaters are replaced with solar hot water (SHW) systems. Thirty homes were monitored in this study. Fifteen homes had SHW systems and fifteen homes had conventional electric water heaters. The data on which this paper is based covers the 1982 calendar year and was collected from the 1982 calendar year and was collected from the City of Austin Electric Department's service area. This investigation shows that solar hot water SHW systems reduce a utility's peak electric demand in the summer. The average demand reduction of SHW systems compared to conventional electric water heaters during the electric peak demand interval from 3PM to 7PM on the ten highest peak days of 1982 was 0.39 kW. The average electric energy used by SHW systems for the the summer and winter periods was 82 kWh/month and 309 kWh/month respectively. For conventional electric water heaters, the average summer electric energy use was 323 kWh/month, while the winter energy use was 565 kWh/month. Therefore a utility which experiences its highest electric load in the summer would benefit from the greater relative decrease in electric demand during the summer than in the winter.

53812 **Hot water tank for use with a combination of solar energy and heat-pump desuperheating.** Andrews, J.W. (to Dept. of Energy). US Patent 4,390,008. 28 Jun 1983. Filed date 26 Jun 1980. vp.

PAT-APPL-163449.

A water heater or system which includes a hot water tank having disposed therein a movable baffle to function as a barrier between the incoming volume of cold water entering the tank and the volume of heated water entering the tank which is heated by the circulation of the cold water through a solar collector and/or a desuperheater of a heat pump so as to optimize the manner in which heat is imparted to the water in accordance to the demand on the water heater or system. A supplemental heater is also provided and it is connected so as to supplement the heating of the water in the event that the solar collector and/or desuperheater cannot impart all of the desired heat input into the water.

53813 **Natural regulating valve.** Fondeur, F. (to HDG Industrie Solaire, 59 - Lille (France)). French Patent 2,510,242/A/. 28 Jan 1983. 12p. (In French).

FR PAT-APPL-8114800.

A valve located at the intersection of a forced fluid pipe and a pipe in which the fluid is flowing naturally. Naturally flowing fluid arriving at the valve will be carried away by the forced flow of fluid and a same amount of fluid will be taken from the fluid in forced flow and will be introduced in the valve of fluid flowing naturally. The invention can be used, in particular, in solar heating facilities.

53814 **Modular roofing component for collecting solar radiation.** Verluise, F.M.P. (to Societe Nationale Elf-Aquitaine, 92 - Paris-La-Defense (France)). French Patent 2,509,445/A/. 14 Jan 1983. 7p. (In French).

FR PAT-APPL-8113327.

The invention concerns a concrete self-supporting slab component with ribs on its outer face. These ribs support a glass pane and the sides of the channels formed by the ribs are coated with a material having great absorbing power. Openings are provided at the ends of the channels to allow the circulation of the coolant air parallel to the channels. Ducting, secured to the inside face of the slab and in front of the openings, is provided for supplying and extracting air.

1410 Solar Collectors And Concentrators

REFER ALSO TO CITATION(S) 54520

53815 **(CONF-830874—26) Steam-generating collectors.** Allen, J.W.; Schertz, W.W. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 7p. NTIS, PC A02/MF A01. Order Number DE83017938.

From 27. annual international technical symposium on high speed photography, videography and photonics; San Diego, CA, USA (21 Aug 1983).

This paper describes the advantages of operating a non-imaging collector in a mode where steam is generated directly in the collector, rather than using a heat-transfer oil and a secondary heat exchanger. The predicted performance advantages from generating steam directly in the collectors are significant, and that performance was verified using a collector built and tested at Argonne National Laboratory. A description of the collector and the test method used to test the collector while operating in a steam generating mode is also presented by this paper. Test results are included for a 6.4 m^2 array of evacuated tube collectors with an advanced absorber coating, silver reflectors, and tubes oriented in a N-S configuration.

53816 (CONF-8006216—, pp 186-195) **Heat conduction in rarefied gases between concentric cylinders: arbitrary accommodation on both surfaces.** Wideman, D.C.; Thomas, J.R. Jr. (Virginia Polytechnic Inst. and State Univ., Blacksburg). 1980. NTIS, PC A12/MF A01.

From Heat Transfer and Fluid Mechanics Institute conference; Los Angeles, CA, USA (23 Jun 1980).

Existing methods for the calculation of heat conduction in low-density gases in cylindrical geometry are limited to the case of complete accommodation of the gas molecules on the outer cylindrical surface. This is appropriate for the classical experiment involving heat transfer from a fine wire to an outer cylinder of much larger radius, since the gas molecules undergo many more collisions with the outer cylinder than with the inner. However, many applications, e.g., evacuated tube solar collectors, involve heat conduction in rarefied gases between concentric cylinders of nearly equal radii and different materials. The analysis reported here extends the four moment method of Lees and Hurlbut to the case of arbitrary accommodation on both inner and outer cylindrical surfaces. Both linear and nonlinear methods are presented, and results computed from each are compared to determine the regime of applicability of the linear method.

53817 (CONF-8208148—, pp 123-129) **Hawaii solar pond project.** McCord, T.B.; Scudder, R.J. (Sets, Inc., Honolulu, HI). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

The topic of solar ponds is treated by defining the concept, tracing the history of its technology, and describing the State of Hawaii's Keahole solar-pond project and its long-range implications. The low operating costs make solar ponds an attractive addition to Hawaii's energy mix. The use of deep-ocean cold water to condense the working fluid in the energy-conversion engine will be Hawaii's unique new contribution to the existing body of solar-pond technology knowledge. 3 figures.

53818 **(DOE/CS/15024—T1) Advanced Solar Components Inc. Final report.** (Advanced Solar Components, Inc., Brockton, MA (USA)). Jul 1981. Contract FG01-80CS15024. 96p. NTIS, PC A05/MF A01. Order Number DE83016152.

Portions are illegible in microfiche products.

A final report is given on a project to develop an inexpensive prototype solar panel suitable for both new construction and retrofit, and to test this design in comparison with price and efficiency of other panels. Details are given on the selection of the final design.

53819 **(DOE/CS/30264—T1) Development of mass-producible line-focus tracking concentrating solar collectors - Category 1: collectors. Final report.** Reese, J. Jr.; Wong, V.; Sutton, G.; Gumbel, H. (Acurex Corp., Mountain View, CA (USA)). Jul 1983. Contract FC04-80CS30264. 114p. NTIS, PC A06/MF A01. Order Number DE83015629.

This report presents the results of a technical study including the detailed design of a low-cost, mass-producible, line-focusing parabolic trough solar collector, the fabrication and test of a prototype drive string for this design, and the conceptual definition of a plant for its mass production. The design represents a significant advancement in the state-of-the-art for cost-effective, medium-temperature (93° to 315°C) solar thermal collectors. Significant improvements were made in the areas of collector performance, manufacturing costs, installation costs, and reliability to yield a major reduction in the cost of delivered thermal energy.

53820 **Solar collector.** Sevelinge, G. (to Societe Creusot-Loire, 75 - Paris (France)). French Patent 2,511,487/A/. 18 Feb 1983. 7p. (In French).

FR PAT-APPL-8115670.

Solar panel comprising a surface for reflecting and concentrating the rays of the sun towards an absorber placed in the focus fo the surface. Under the invention the absorber is mounted on the top of a single mast fixed in the centre of the reflecting surface, perpendicular to it.

53821 **Tubular cell solar collector.** Paeye, G. (to Societe Jeumont-Schneider, 75 - Paris (France)). French Patent 2,511,130/A/. 11 Feb 1983. 7p. (In French).

FR PAT-APPL-8115257.

Fine glass tubes are placed perpendicular to the collecting plane of the absorber. At least one inclined reflector is placed on a plane which includes the east-west axis, so as to modify the angle of incidence of the solar rays with the collecting plane and to increase the number of rays hitting this plane.

53822 **Solar energy collector.** Chevalier, P.; Thellier, F. (to Societe Bertin et Compagnie, 78 - Plaisir (France)). French Patent 2,511,131/A/. 11 Feb 1983. 19p. (In French).

FR PAT-APPL-8115260.

It is essentially characterized by a separate absorber-exchanger subassembly, comprising two metal plates marking a space between them, the internal structure of which is fitted with elements which evenly distribute the flow of coolant by helping to increase to a significant extent the exchange area between it and the absorbent plate. According to a variant, these elements are constituted by the pipe components of a hydraulic circuit such as a coil fixed by a thermo-conducting connection on the inside face of the absorbent plate. According to this variant, the operating mode of this collector is dual; it is used for producing domestic hot water in the summer and for heating recycled air in the winter. It applies to the heating of dwellings and industrial or sports premises.

53823 **Modular solar panel.** Legendre, A.L. (to Centre National d'Etudes Spatiales, 31 - Toulouse (France)). French Patent 2,509,843/A/. 21 Jan 1983. 6p. (In French).

FR PAT-APPL-8117389.

This modular solar panel is composed of three separate superposable components: one greenhouse effect component built of two sheets of flexible and transparent plastic material welded along the edges and transversally so as to form communicating compartments, an absorbent component made of two impermeable sheets in a flexible material having a high solar radiation coefficient of absorption welded along the edges and transversally to form a circuit in which the coolant can flow, and an insulation component made of a reflecting sheet. Each of these components is provided with eyelets on the edges to take securing means.

53824 **Process for manufacturing a selective absorber for solar panels and selective absorber obtained.** Aries, L.; Traverse, J.P. (to Agence Nationale de Valorisation de la Recherche (ANVAR), 92 - Paris-Defense (France)). French Patent 2,509,446/A/. 14 Jan 1983. 17p. (In French).

FR PAT-APPL-8113815.

The invention concerns a process for manufacturing a selective absorber for solar panels enabling a solar radiation collection area to be obtained having a high absorption factor and a low emission factor. The collection surface is made of a ferrous alloys containing chromium which is immersed in an acid bath containing oxygen atoms and at least one sulphur, selenium and/or tellurium based metalloid substance. Beforehand, the state of the collection surface is adjusted in order to activate it.

53825 **Rim-drive cable-aligned heliostat collector system.** Dolan, J.E.; Sands, T.D. US Patent Application 6-429,923. 30 Sep 1982. 29p. Contract AC02-77CH00178.

Disclosed is a heliostat collector apparatus comprising at least one heliostat suspended from a plurality of longitudinally extending linkage means. An enclosure structure is disposed adjacent the heliostat and provides a means for allowing the heliostat to be substantially protected from weathering. A first drive means is operatively connected to the heliostat to effect steering thereof in at least one of first and second predetermined directions. Finally, a frame member is adapted for supporting the heliostat at an inner portion thereof. The frame includes a plurality of outer expandable portions. Each one of the expandable portions is adapted to slidably engage a corresponding one of the plurality of linkage means. The expandable portions are further adapted to allow the heliostat to be slidably moved along the linkage means in directions away from and towards the enclosure structure and to substantially reduce stress acting on the heliostat during steering.

53826 **Solar heat receiver.** Hunt, A.J.; Hansen, L.J.; Evans, D.B. US Patent Application 6-426,370. 29 Sep 1982. 14p. Contract W-7405-ENG-48.

A receiver is described for converting solar energy to heat a gas to temperatures from 700 to 900°C. The receiver is formed to minimize impingement of radiation on the walls and to provide

maximum heating at and near the entry of the gas exit. Also, the receiver is formed to provide controlled movement of the gas to be heated to minimize wall temperatures. The receiver is designed for use with gas containing fine heat absorbing particles, such as carbon particles.

53827 **Gradient zone-boundary control in salt-gradient solar ponds.** Hull, J.R. US Patent Application 6-426,362. 29 Sep 1982. 16p. Contract W-31-109-ENG-38.

A method and apparatus for suppressing zone boundary migration in a salt gradient solar pond includes extending perforated membranes across the pond at the boundaries, between the convective and non-convective zones, the perforations being small enough in size to prevent individual turbulence disturbances from penetrating the hole, but being large enough to allow easy molecular diffusion of salt thereby preventing the formation of convective zones in the gradient layer. The total area of the perforations is a sizeable fraction of the membrane area to allow sufficient salt diffusion while preventing turbulent entrainment into the gradient zone.

53828 **Carbon-particle generator.** Hunt, A.J. US Patent Application 6-426,369. 29 Sep 1982. 14p. Contract W-7405-ENG-48.

A method and apparatus whereby small carbon particles are made by pyrolysis of a mixture of acetylene carried in argon. The mixture is injected through a nozzle into a heated tube. A small amount of air is added to the mixture. In order to prevent carbon build-up at the nozzle, the nozzle tip is externally cooled. The tube is also elongated sufficiently to assure efficient pyrolysis at the desired flow rates. A key feature of the method is that the acetylene and argon, for example, are premixed in a dilute ratio, and such mixture is injected while cool to minimize the agglomeration of the particles, which produces carbon particles with desired optical properties for use as a solar radiant heat absorber.

15 GEOTHERMAL ENERGY

1502 Geology And Hydrology Of Geothermal Systems

53829 **(USGS-PP—1044-I) Geothermal hydrology of Warner Valley, Oregon: a reconnaissance study.** Sammel, E.A.; Craig, R.W. (Geological Survey, Menlo Park, CA (USA)). 1981. 67p. GPO.

Warner Valley and its southern extension, Coleman Valley, are two of several high-desert valleys in the Basin and Range province of south-central Oregon that contain thermal waters. At least 20 thermal springs, defined as having temperatures of 20°C or more, issue from Tertiary basaltic flows and tuffs in and near the valleys. Many shallow wells also produce thermal waters. The highest measured temperature is 127°C, reported from a well known as Crump geyser, at a depth of 200 meters. The hottest spring, located near Crump geyser, has a surface temperature of 78°C. The occurrence of these thermal waters is closely related to faults and fault intersections in the graben and horst structure of the valleys. Chemical analyses show that the thermal waters are of two types: sodium chloride and sodium bicarbonate waters. Chemical indicators show that the geothermal system is a hot-water rather than a vapor-dominated system. Conductive heat flow in areas of the valley unaffected by hydrothermal convection is probably about 75 milliwatts per square meter. The normal thermal gradient in valley-fill dpeosits in these areas may be about 40°C per kilometer. Geothermometers and mixing models indicate that temperatures of equilibration are at least 170°C for the thermal components of the hotter waters. The size and location of geothermal reservoirs are unknown.

1503 Geothermal Exploration And Exploration Technology

REFER ALSO TO CITATION(S) 53829, 53829

53830 (CONF-8208148—, pp 149-150) **Developer's point of view concerning geothermal resources in Hawaii.** Craddick, E.C. 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

Some of the immediate concerns to be faced in the exploration for geothermal resources are enumerated as being: (1) difficulty in maintaining tolerable environmental conditions while drilling; (2) the unique drilling requirements necessary for penetrating geothermal reservoirs; (3) sharing the wealth of geothermal drilling information; (4) defining the geothermal market in Hawaii; and (5) miscellaneous other problems to be addressed. The future of geothermal power in Hawaii is anticipated to be bright.

53831 (CONF-8208148—, pp 154-156) **Kahauale'a Geothermal Project.** Moss, R. (Mid-Pacific Geothermal, Inc., Honolulu, HI). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

The True Geothermal Energy Company and Mid-Pacific Geothermal, Inc. have developed the Kahauale'a Geothermal Project on the Island of Hawaii. The project is described in terms of its site location and description, geology and resource potential, the necessary government permits, and environmental concerns.

1504 Legal And Institutional Aspects

REFER ALSO TO CITATION(S) 53831, 53840, 54109

53832 (CONF-8208148—, pp 151-153) **Private-sector geothermal development.** Denton, J. (Thermal Power Co., Honolulu, HI). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

The problems facing three groups - developers, the public, and government - regarding the commercialization of geothermal energy in Hawaii are listed. Regulatory uncertainty and economic concerns are common to all three groups, which must cooperate if a successful transition is to occur.

1505 Economic And Financial Aspects

REFER ALSO TO CITATION(S) 53830

1506 Environmental Aspects And Waste Disposal

REFER ALSO TO CITATION(S) 53837

53833 **(USGS-OFR—78-929) Regional and local networks of horizontal control, Cerro Prieto Geothermal Area, Mexico.** Massey, B.L. (Geological Survey, Sacramento, CA (USA)). 1978. 9p. NTIS, PC A02/MF A01. Order Number DE83903083.

Portions are illegible in microfiche products.

The Cerro Prieto geothermal area in the Mexicali Valley 30 km southeast of Mexicali, Baja California, is probably deforming due to (1) the extraction of large volumes of steam and hot water, and (2) active tectonism. Two networks of precise horizontal control were established in Mexicali Valley by the US Geological Survey in 1977-78 to measure both types of movement as they occur. These networks consisted of (1) a regional trilateration net brought into the mountain ranges west of the geothermal area from survey stations on an existing US Geological Survey crustal-strain network north of the international border, and (2) a local net tied to stations in the regional net and encompassing the area of present and planned geothermal production. Survey lines in this net were selected to span areas of probable ground-surface movements in and around the geothermal area. Electronic distance measuring (EDM) instruments, operating with a modulated laser beam, were used to measure the distances between stations in both networks. The regional net was run using a highly precise long-range EDM instrument, helicopters for transportation of men and equipment to inaccessible stations on mountain peaks, and a fixed wing airplane flying along the line of sight. Precision of measurements with this complex long-range system approached 0.2 parts per million of line length. The local net was measured with medium range EDM in-

strument requiring minimal ancillary equipment. Precision of measurements with this less complex system approached 3 parts per million for the shorter line lengths. The detection and analysis of ground-surface movements resulting from tectonic strains or induced by geothermal fluid withdrawal is dependent on subsequent resurveys of these networks.

1508 Geothermal Power Plants

53834 **(DOE/RA/50239—T3-Rev.1) Heber Geothermal Binary Demonstration Project. Final design availability assessment. Revision 1.** Mulvihill, R.J.; Reny, D.A.; Geumlek, J.M.; Purohit, G.P. (Pickard-Lowe and Garrick, Inc., Irvine, CA (USA)). Feb 1983. Contract FC03-80RA50239. 80p. NTIS, PC A05/MF A01. Order Number DE83017559.

Portions are illegible in microfiche products.

An availability assessment of the principal systems of the Heber Geothermal Power Plant has been carried out based on the final issue of the process descriptions, process flow diagrams, and the approved for design P and IDs prepared by Fluor Power Services, Inc. (FPS). The principal systems are those which contribute most to plant unavailability. The plant equivalent availability, considering forced and deferred corrective maintenance outages, was computed using a 91 state Markov model to represent the 29 principal system failure configurations and their significant combinations. The failure configurations and associated failure and repair rates were defined from system/subsystem availability assessments that were conducted using the availability assessments based on the EPRI GO methodology and availability block diagram models. The availability and unavailability ranking of the systems and major equipment is presented.

1509 Geothermal Engineering

53835 (CONF-8208148—, pp 112-117) **HGP - a geothermal project.** Woodruff, J.L. (Dept. of Planning and Economic Development, Honolulu, HI). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

The subject of geothermal energy development in Hawaii, especially Hawaii's first successful geothermal well, the HGP-A generator project, is presented. The well reaches more than a mile below sea level and tests have estimated it's capability of supporting a 3-MW operator. Descriptions are given for how a geothermal well works and what sort of precautions must be taken to protect it from natural disasters. Some other various uses that geothermal energy may be put to are listed. 1 figure, 1 table.

53836 **(SAND—83-7102) Program for the improvement of downhole drilling motor bearings and seals. Phase V. Final report.** DeLafosse, P.H.; Tibbitts, G.A.; Black, A.D.; DiBona, B.G. (Drilling Research Lab., Inc., Salt Lake City, UT (USA)). Aug 1983. Contract AC04-76DP00789. 101p. NTIS MF A01. Order Number DE83018068.

Microfiche only, copy does not permit paper copy reproduction. Original copy available until stock is exhausted.

The work done during the fifth and final phase of a program to improve downhole drilling motor bearing and seals is described. The principal activities in this phase were: (a) testing seals with abrasive-laden mud on the low-pressure side; (b) test second and third generation designs of both elastomeric chevron seals and Teflon U-seals; and (c) testing a full-scale bearing/seal package. Several operating parameters which have a radical effect on seal life were identified, and some promising designs and materials were tested.

53837 **(SGP-TR—40) Proceedings of fifth workshop on Geothermal Reservoir Engineering.** Ramey, H.J. Jr.; Kruger, P. (eds.). (Stanford Univ., CA (USA). Stanford Geothermal Program). 1979. Contract AT03-76ET28364. 393p. (CONF-791235—). NTIS, PC A17/MF A01. Order Number DE83012133.

From 5. geothermal reservoir engineering workshop; Stanford, CA, USA (12 Dec 1979).

Forty-four papers are included. Two papers were abstracted for EDB previously. Separate abstracts were prepared for forty-two. (MHR)

53838 **Potential advantages of a water jet reaming device.** Summers, D.A. (Univ. of Missouri, Rolla). pp IV.2.1-IV.2.8 of Water jet symposium. Wang, F.D.; Ozdemir, L.; Miller, R. (eds.). Golden, CO; Colorado School of Mines Press (1982). (CONF-8104201—).

From 1. US water jet symposium; Golden, CO, USA (7 Apr 1981).

One of the advantages sought for new technology, if it is to become a useful device, is that it should increase productivity while keeping the operation economical. In this regard, water jet reaming of geothermal wells for both extraction and re-injection appears to show promise. It is shown, using conventional formulae that reaming geothermal wells from 12 cm to 1 m radius will increase fluid flow to the point that 25% less wells could be required to establish a geothermal field. With this objective, experiments are described to verify that water jets can effectively cut rock at required level, that is at a depth of 2000 m in a fluid filled borehole. A conceptual mechanism to achieve this reaming is developed and, in simple form, the concept is demonstrated in a surface test.

1510 Direct Energy Utilization

53839 **(DOE/ID/01606—T1) Aquaculture report 1976.** Campbell, D.K.; Watson, L.; Kent, J.C.; Johnson, D.W. (Idaho State Univ., Pocatello (USA). Dept. of Biology). 8 Apr 1977. Contract AS07-76ID01606. 57p. NTIS, PC A04/MF A01. Order Number DE83017488.

Growth of channel catfish (Ictalurus punctatus) and Tilapia zillii in the Reft River Geothermal Area (RRGT) geothermal waters can equal or surpass that in a commercial aquaculture facility. Fish and prawn mortality over the course of the intermediate term preliminary study did not appear to be related to any inherent geothermal water chemistry conditions. Temperature control was a problem but does not appear to be beyond design control. The absence of temperature-related mortality in channel catfish, Tilapia zilli, and yellow perch (Perca flavescens) indicates increased survival and suggests reduced expenditures for disease control. It may also allow higher fish densities in commercial aquaculture operations using geothermal water. Results of this study indicate potential for commercial aquaculture development at the Raft River Geothermal Testing Site.

53840 **(NMERDI—2-67-2238(1)) Leasing of federal surface lands for direct-use geothermal-energy developments.** Whittier, J.; Icerman, L. (New Mexico State Univ., Las Cruces (USA). New Mexico Energy Inst.). Aug 1983. 20p. Univ. of New Mexico, 117 Richmond Dr., N.E., Albuquerque, NM 87106.

Amendments to the Federal Geothermal Resources Leasing Program regulations may significantly affect the development of geothermal resources by providing for the use of federal surface lands for direct-use geothermal applications in addition to electricity generation facilities. The amended Rules and Regulations became effective on May 20, 1983, and apply only to lands administered by the Bureau of Land Management. According to the new procedures, the right to obtain a surface use license for a facility using geothermal energy directly resides with the current geothermal rights holder. A minimum annual rental rate of $10 per acre has been established. Many issues involving the acquisition of a surface use license are yet to be resolved because the new regulations are untested and subject to administrative interpretation.

1520 Geothermal Data And Theory

53841 **(DOE/ID/12147—T1-Rev.) Improvements in geothermometry. Final technical report. Rev.** Potter, J.; Dibble, W.; Parks, G.; Nur, A. (Stanford Univ., CA (USA). Dept. of Geophysics). Aug 1982. Contract FC07-80ID12147. 64p. NTIS, PC A04/MF A01. Order Number DE83012181.

Portions are illegible in microfiche products.

Alkali and alkaline earth geothermometers are useful for estimating geothermal reservoir temperatures, though a general theoretical basis has yet to be established and experimental calibration needs improvement. Equilibrium cation exchange between feldspars provided the original basis for the Na-K and Na-K-Ca geothermometers (Fournier and Truesdell, 1973), but theoretical, field and experimental evidence prove that neither equilibrium nor feldspars are necessary. Here, evidence is summarized in support of these observations, concluding that these geothermometers can be expected to have a surprisingly wide range of applicability, but that the reasons behind such broad applicability are not yet understood. Early experimental work proved that water-rock interactions are slow at low temperatures, so experimental calibration at temperatures below 150° is impractical. Theoretical methods and field data were used instead for all work at low temperatures. Experimental methods were emphasized for temperatures above 150°C, and the simplest possible solid and solution compositions were used to permit investigation of one process or question at a time. Unexpected results in experimental work prevented complete integration of the various portions of the investigation.

17 WIND ENERGY

1701 Availability (climatology)

53842 (CONF-8208148—, pp 138-145) **Overview of Hawaii's wind-energy program.** Neill, D.R. (Hawaii Natural Energy Inst., Honolulu). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

Wind-energy development has progressed rapidly in Hawaii during the last two years. Various agencies are responsible for wind-power measurement, and their statistics are contributed to the Hawaii Wind Data Bank for future wind research and wind-farm development. Some of the most successful wind projects are described. 5 references, 3 figures, 4 tables.

53843 **(DOE/BP—167) Regional Wind-Energy-Assessment Program. Progress report, October 1981-September 1982.** Baker, R.W.; Wade, J.E.; Persson, P.O.G. (Oregon State Univ., Corvallis (USA). Dept. of Atmospheric Science). Dec 1982. 115p. (BPA—82-8). NTIS, PC A06/MF A01. Order Number DE83018259.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The research activities done in FY 1982 on the Regional Wind Energy Assessment Program are described. This includes work completed in large area wind power prospecting and data collection and analysis. The discussion of wind data analysis includes the wind data network, climatological wind speed and energy analysis, and wind statistical analysis. Also discussed is a wind power prospecting helicopter survey over the entire state of Washington. (LEW)

53844 **(DOE/BP—168) Regional Wind-Energy-Assessment Program. Progress report, October 1981-September 1982. Appendix. Wind statistic summaries.** Baker, R.W.; Wade, J.E.; Persson, P.O.G. (Oregon State Univ., Corvallis (USA). Dept. of Atmospheric Science). Dec 1982. 68p. (BPA—82-8-App.). NTIS, PC A04/MF A01. Order Number DE83018258.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Mean monthly wind speeds at the wind power data sites in the states of Washington, Oregon, Montana, and Nevada for the period of June 1981 to May 1982 are tabulated, as well as wind speed frequency distribution summaries. (LEW)

1706 Wind Energy Engineering

REFER ALSO TO CITATION(S) 53842, 53844, 54108

53845 (CONF-8208148—, pp 134-137) **Utility-scale wind energy and the Kahuku wind-energy project.** Morton, T.R. (Windfarms, Ltd., San Francisco, CA). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

Since 1979, Windfarms, an organization dedicated to the development of wind energy for utilities, has been working on the world's first 80-MW windfarm at Kahuku Point, Hawaii. The project is described fully with its present status given. The wind-turbine generators must be available commercially by December 1985 or the project stands to lose $350 million in federal funds.

53846 **(DOE/BP—137) Investigation of small wind-turbine induction generators. Final technical report, September 16, 1980-December 31, 1982.** Venkata, S.S.; Boardman, E.C. (Washington Univ., Seattle (USA)). 1982. Contract AC79-80BP22849. 145p. NTIS, PC A07/MF A01. Order Number DE83017902.

A new and accurate experimental set-up was developed to test induction machines in the 1-5 kW range. Two single-phase induction generators were tested - the Enertech 1500 and Enertech 1800. A detailed mathematical model to evaluate the performance of single-phase induction generators was developed and documented in the form of a FORTRAN computer simulation program. Then the program was used to analyze the Enertech 1800 and the results were compared with the test results. (LEW)

53847 **(DOE/NASA/20320—48) Mathematical model for the doubly fed wound-rotor generator.** Brady, F.J. (National Aeronautics and Space Administration, Cleveland, OH (USA). Lewis Research Center). 1983. Contract AI01-76ET20320. 8p. (NASA-TM—83454; CONF-830705—5). NTIS, PC A02/MF A01. Order Number DE83018232.

From IEEE Power Engineering Society summer meeting; Los Angeles, CA, USA (17 Jul 1983).

Present electrical power generators dictate that the prime movers operate at constant speed. This is necessary because the power must be generated at constant frequency. However, some prime movers are, by their nature, not constant-speed-devices, such as hydroturbines and wind turbines. Various schemes have been proposed that remove the constant-speed requirement. The scheme investigated in this paper is a wound-rotor generator, whose rotor is excited with variable-frequency power. This paper develops a mathematical model which predicts what the rotor excitation must be, if the stator is to operate at constant frequency and voltage. A machine with three-phase rotor and stator is analyzed. It is described by two sets of circuit equations; one set for the stator, another for the rotor. Under balanced conditions, these two sets reduce to only two equations. In practical application, these machines are operated with constant stator-terminal voltage. When this constraint is applied to the two circuit equations, expressions for currents and voltages, on both rotor and stator are obtained. These same circuit equations can be used to generate a set of volt-ampere equations. If the expressions for current and voltages are substituted into the volt-ampere equations, a relationship between active stator volt-amperes, active rotor volt-amperes, and shaft power is obtained. This relationship permits a new interpretation of the power flow.

53848 **(DOE/NASA/20320—50) Analytical model for predicting emergency shutdown of a two-bladed horizontal-axis turbine.** Miller, D.R.; Ensworth, C.B.F. (National Aeronautics and Space Administration, Cleveland, OH (USA). Lewis Research Center). 1983. Contract AI01-76ET20320. 16p. (NASA-TM—83472; CONF-830622—26). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83017796.

From American Solar Energy Society meeting; Minneapolis, MN, USA (1 Jun 1983).

An analytical model was developed to predict the shutdown characteristics of a large two-bladed horizontal-axis wind turbine following a sudden loss of generator load. The analytical model is described and used to predict rotor speed time histories following a loss of load, for a trip-control rotor and an aileron-control rotor. These shutdown predictions are compared with experimental results from full-scale tests conducted on the Mod-0 100 kW wind turbine with both a tip-control rotor and aileron-control rotor. Predicted and measured rotor speed time histories are compared based on peak overspeed rpm, time at which this peak rpm occurs, and the general shape of the time history curve. The results of this comparison indicated there was good agreement between predictions and the full-scale test results, thus verifying the analytical shutdown model. In general, the best agreement between predictions and full-scale test results was obtained up to the time where the peak over-speed rpm occurred.

53840 **(PB—83-165936) Energy storage for wind-generator application.** Russell, F.M. (Science and Engineering Research Council, Chilton (UK). Rutherford Appleton Lab.). [nd]. 10p. NTIS, PC A02/MF A01.

A low-cost method was developed for storing energy and stiffening power supplied by wind generators. It involved inflatable, fabric-reinforced elastic liners buried underground and containing a fluid, probably water, at an intermediate pressure. The ground would be subject to elastic deformation and the method could be applicable to unstable ground such as deep sand, heterogeneous sedimentary or other unconsolidated deposits in remote locations or hostile environments. While the density of energy storage was considered low, compared with pumped-hydro systems, the technology could be attractive for developing countries.

53850 **(PB—83-173047) Commercial wind energy conversion systems (wecs) monitoring and utility impacts study. Final report.** Finch, T.; Stafford, R.W. (Bronx Frontier Development Corp., NY (USA)). Sep 1981. 167p. NTIS, PC A08/MF A01.

In the demonstration project detailed in the report, the performance of a 25 kW wind turbine operating at an industrial site in the Bronx was monitored and evaluated, with particular attention paid to the operation of the equipment necessary for safe and reliable utility interconnection. The turbine was tested for a number of different generator/power conditioning configurations and a number of problems were encountered, including a lightning strike and turbine overspeeds. The system was interconnected to Consolidated Edison's power grid to allow backfeed of excess power and the quality of this backfeed was then measured. A significant amount of practical data on instrumentation and metering equipment was also collected during the course of the project.

53851 **(PNL—4663) Candidate wind-turbine generator site cumulative meteorological data summary and data for January 1982 through September 1982.** Sandusky, W.F.; Buck, J.W.; Renne, D.S.; Hadley, D.L.; Abbey, O.B.; Bradymire, S.L.; Gregory, J.L. (Pacific Northwest Lab., Richland, WA (USA)). Aug 1983. Contract AC06-76RL01830. 381p. NTIS, PC A17/MF A01. Order Number DE83018222.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Summarized cumulative hourly meteorological data for 20 new sites selected in early 1980 as part of the expanded candidate site program are presented. The reporting period is July 1980 through September 1982. The data collection program at some individual sites may not span this entire period, but will be contained within the reporting period. The purpose of providing the summarized data is to document the data collection program and to provide data that could be considered representative of longer-term meteorological conditions at each site. For each site, data are given in eight tables and in a topographic map showing the approximated location of the meteorological tower and turbine, if applicable. Use of the information from these tables, along with information about specific wind turbines, should allow the user to estimate the potential for longer-term average wind energy production at each site. Two appendices of other data are provided. Appendix A contains summarized data collected at new and original sites during the period January 1982 through September 1982. Appendix B contains cumulative summarized data for those original sites selected in 1976 with data collection programs continuing into 1982.

53852 **(SAND—83-7029) Dynamic-stall regulation of the Darrieus turbine.** Oler, J.W.; Strickland, J.H.; Im, B.J.; Graham, G.H. (Texas Tech Univ., Lubbock (USA). Dept. of Mechanical Engineering). Aug 1983. Contract AC04-76DP00789. 180p. NTIS, PC A09/MF A01. Order Number DE83017994.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

A two-dimensional unsteady airfoil analysis is described which utilizes a doublet panel method to model the airfoil surface, an integral boundary scheme to model the viscous attached flow, and discrete vortices to model the detached boundary layers which form the airfoil wake region. This model has successfully predicted steady lift and drag coefficients as well as pressure distributions for several airfoils with both attached and detached boundary layers. Unsteady calculations have thus far been limited to attached flow situations. Instantaneous pressure distributions have also been obtained on a single-bladed rotor operating in a tow tank in order to provide experimental data for eventual comparison with analytical predictions.

53853 **Vortex-augmented cooling tower - windmill combination.** McAllister, J.E. Jr. US Patent Application 6-414,193. 2 Sep 1982. 27p. Contract AC09-76SR00001.

A cooling tower for cooling large quantities of effluent water from a production facility by utilizing natural wind forces includes the use of a series of helically directed air inlet passages extending outwardly from the base of the tower to introduce air from any direction in a swirling vortical pattern while the force of the draft created in the tower makes it possible to place conventional power generating windmills in the air passage to provide power as a by-product.

20 ELECTRIC POWER ENGINEERING

53854 **(DOE/ET/29071—T5) Compact gas-insulated transformer. Fourteenth quarterly report.** (General Electric Co., Pittsfield, MA (USA). Power Transformer Dept.). Aug 1983. Contract AC02-79ET29071. 210p. NTIS MF A01. Order Number DE83017441.

Microfiche only, copy does not permit paper copy reproduction.

Objective is to develop a compact, more efficient, quieter transformer which does not rely on mineral oil insulation. Compressed SF_6 is used as the external insulation and polymer film as the insulation between turns. A separate liquid cooling system is also provided. This document reports progress made in design, mechanical, dielectric, short circuit, thermal, materials, prototype, accessories, commercialization, and system studies. (DLC)

53855 **(TR-EE—83-25) Decentralized control of large transient in power systems: theory and application. Final report, January 1981-August 1983.** DeCarlo, R.; Hawley, P.; Sebok, D. (Purdue Univ., Lafayette, IN (USA). School of Electrical Engineering). Aug 1983. Contract AC01-79ET29365. 105p. NTIS, PC A06/MF A01. Order Number DE83017013.

Portions are illegible in microfiche products.

Chapter 1 describes a continuation algorithm to construct decentralized state feedback gains which place the natural frequencies (natural modes of vibration or eigenvalues) of a linearized power system at desired locations. Chapter 2 and 3 address the problem of designing a decentralized dither control for linearly interconnected synchronous machines, each of which is nonlinear. In Chapter 2, the theory finds application to the nonlinear third order model of a single machine infinite bus system where the primary control is via an ac-dc converter. Similarly Chapter 3 considers a two machine system with individual machine converters acting as the primary control. Computer simulations of the control action given various system perturbations are found in both Chapters 2 and 3.

2001 Power Plants And Power Generation

REFER ALSO TO CITATION(S) 54042, 54104

53856 **(ANL/FE—83-13) Design of advanced fossil-fuel systems (DAFFS). A study of three developing technologies for coal-fired, base-load electric power generation. Steam-cooled pressurized fluidized-bed power plant.** (Bechtel Group, Inc., San Francisco, CA (USA); Westinghouse Electric Corp., Pittsburgh, PA (USA). Research and Development Center; Foster Wheeler Development Corp., Livingston, NJ (USA)). Jun 1983. Contract W-31-109-ENG-38. 322p. NTIS, PC A14/MF A01. Order Number DE83017732.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The objectives of this report are to present the facility description, plant layouts, and additional information which define the conceptal engineering design, and to provide performance and cost estimates for the steam-cooled pressurized fluidized-bed (PFB) power plant. Following the introductory comments, the results of the study of the steam-cooled PFB power plant are summarized in Section 2. In Section 3, a description of plant systems and facilities is provided. Section 4 includes pertinent performance informtion and assessments of availability, natural resource requirements and environmetal impact. Estimates of capital costs, operating and maintenance costs and cost of electricity are presented in Section 5. Bechtel comments regarding the plant configuration and performance are provided in Section 6. The design and cost estimate reports which were prepared by Westinghouse for items within their scope of responsibility are included as Appenices A and B, respectively. Appendix C is the power plant equipment list for systems within the BGI scope. The design and cost estimate classifications chart referenced in Section 5 is included as Appendix D. 6 references, 20 figures, 13 tables

53857 **(ANL/FE—83-14) Design of advanced fossil-fuel systems (DAFFS). A study of three developing technologies for coal-fired, base-load electric power generation. Air-cooled pressurized fluidized-bed power plant.** (Bechtel Group, Inc., San Francisco, CA (USA); Westinghouse Research and Development Center, Pittsburgh, PA (USA); Foster Wheeler Development Corp., Livingston, NJ (USA)). Jun 1983. Contract W-31-109-ENG-38. 334p. NTIS, PC A15/MF A01. Order Number DE83017736.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The objectives of this report are to present the facility description, plant layouts and additional information which define the conceptual engineering design, and to provide performance and cost estimates for the air-cooled pressurized fluidized bed (PFB) power plant. Following the introductory comments, the results of the study of the air-cooled PFB power plant are summarized in Section 2. In Section 3, a description of plant systems and facilities is provided. Section 4 includes pertinent performance information and assessments of availability, natural resource requirements and environmental impact. Estimates of capital costs, operating and maintenance (O & M) costs and cost of electricity are presented in Section 5. Bechtel comments regarding the plant configuration and performance are provided in Section 6. The design and cost estimate reports which were prepared by Westinghouse for items within their scope of responsibility are included as Appendices A and B, respectively. Appendix C is the power plant equipment list for systems within the BGI scope. The design and cost estimate classifications chart referenced in Section 5 is included as Appendix D. 7 references, 19 figures, 13 tables.

53858 **(DOE/CE/15094—T1) Reclaiming lost capability in power plant coal conversions: an innovative, low-cost approach. Final report.** (Energotechnology Corp., Cambridge, MA (USA)). Jul 1983. Contract FG01-82CE15094. 31p. NTIS, PC A03/MF A01. Order Number DE83016193.

Portions are illegible in microfiche products.

A large number of utility power plants, originally designed for coal firing but converted to firing oil in the 1960s are currently being considered for reconversion to coal firing. Re-conversion to coal will require considerable expenditures for modifying and refurbishing the boiler and associated auxiliaries, as well as for pollution abatement equipment. Several of these plants can, with suitable redesign of the equipment being refurbished or replaced and incorporating methods described in our patents, generate considerably more power. This increase in output, if realized at a small additional expenditure, will be useful in reducing generation from oil-fired units and gas turbines during peak demand. It can also be used for emergency or spinning reserves, as well as for accommodating load growth, depending on the particular utility's system requirements. The proposed concept for augmenting capacity of coal-converted, derated units appears to have fairly wide applicability for providing low cost peaking and mid-range power by firing oil or gas ahead of the economizer, while the unit is operating at its baseload (derated) capacity by firing coal in the furnace. By firing coal in an external combustor and ducting the hot gas ahead of the economizer, the unit can be operated longer at the higher rating and generate base-load power at a lower cost than the derated unit. In either case, increasing the economizer size to nearly twice the precoal conversion surface appears to be justified. Current excess generating capacity in most regions of the country and the reduced price for fuel oil preclude widespread utility interest at this time; load growth, higher oil prices and an early, successful and well publicized application of the concept will greatly benefit its acceptance by utilities.

53859 **(DOE/RG—0063) Florida statewide coal-conversion study: coal-supply and transportation analysis.** Tobin, R.L.; Jastrow, J.D.; Meleski, S.A.; Zielen, A.J. (Argonne National Lab., IL (USA)). Sep 1983. Contract W-31-109-ENG-38. 133p. NTIS, PC A07/MF A01. Order Number DE83017787.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The US Department of Energy is assessing the cessation of the use of oil and natural gas in up to 14 generating stations and 27 generating units in the state of Florida. The proximity of these 14 coal-capable stations toone another suggests a potential for the interaction of coal combustion impacts, creating larger or different types of effects than would generally be associated with individual stations. This study is an analysis of the cumulative and interactive effects of the increased demand for coal transportation resulting from the conversion of these stations. The Florida utilities are described - including existing coal-fired plants, proposed new coal-fired plants, and the conversion candidates being analyzed. Coal use in the Southeast Region (Florida, Georgia, Alabama, and Mississippi) is summarized for both current and projected use. An overview of the transportation system, including proposed enhancements, is provided. Existing coal movements into Florida and transportation modes available to converting and new coal-fired powerplants are presented. The Freight Network Equilibrium Model (FNEM), an integrated rail/water freight model, is the major tool used in the analyses of coal transportation impacts resulting from the conversions. The model and input data are described. The results of the analyses are summarized, including analyses of impacts of the potential use of a coal slurry pipeline and of coal/oil and coal/water mixtures.

53860 **(PB—83-207407) Determination of good-engineering-practice stack height: a fluid mode demonstration study for a power plant.** Lawson, R.E. Jr.; Snyder, W.H. (Environmental Protection Agency, Research Triangle Park, NC (USA). Environmental Sciences Research Lab.). Apr 1983. 83p. (EPA—600/3-83-024). NTIS, PC A05/MF A01.

A study using fluid modeling to determine good-engineering-practice (GEP) stack height for a power plant installation is discussed. Measurements are presented to describe the simulated boundary layer structure, plume dispersion characteristics in the absence of the model plant building, and the maximum ground-level concentration of effluent downstream of the source, both with and without the model plant building. Analysis of the maximum ground-level concentration shows that, in this case, a stack height of 64.1m meets the current GEP criteria for 100% plant load conditions.

53861 **(TVA/OP/EDT—83/12) Examining relationships between coal characteristics and the performance of TVA power plants. Final report.** Barrett, R.E.; Mack, G.A.; Holt, E.C. Jr. (Battelle Columbus Labs., OH (USA); Hoffman-Holt, Inc., Silver Spring, MD (USA)). Sep 1982. 254p. NTIS, PC A12/MF A01. Order Number DE83910852.

Portions are illegible in microfiche products.

An analysis of data from most TVA units (omitting Allen, Cumberland, and Watts Bar) showed that coal ash and moisture and boiler age had the greatest effect on boiler efficiency. The following relationship was derived for boiler efficiency for the TVA system as a whole: Boiler Efficiency = K -0.022 (Ash) - 0.100 (Moisture) -0.039 (Age). The constant K has a different value for each group of like boilers. Coal sulfur and boiler load were investigated as possible variables, but were not shown to be important statistically. The above model accounted for 91 percent of the variability in reported boiler efficiency values. Other relationships are reported for individual groups of identical boilers and for aggregates of similar boilers. For the TVA system as a whole, boiler availability relationship was defined, calculated and is given in the report. Over the range of ash fired at TVA plants (generally 12 to 24 percent), this relationship indicated that, for a typical plant, the outage hours may vary by 360 hours/year because of changes in ash alone. Likewise, over the range of sulfur values for TVA plants (generally 1.0 to 5.0), outage hours at a typical plant may vary by as much as 870 hours per year due to sulfur alone. Maintenance costs that were judged to be coal-related were studied to determine how maintenance costs varied with coal and other factors for each cost category and for each plant. Results are only reported for plants and equipment categories where the result was considered statistically significant; e.g., the correlation coefficient was equal to or exceeded the 90 percent confidence interval. An effort made to identify operating costs that might be coal-related led to conclusion. After examination of the available operating cost data, it was decided that it would not be worthwhile to expend much effort on analysis in this are. As a result of the study, a number of recommendations were made as regards TVA operations or data handling.

2002 Environmental Aspects

REFER ALSO TO CITATION(S) 53384, 53391, 53392, 53393, 54367, 54901, 54902

53862 **Impingement of threadfin shad: effects of temperature and hydrography.** McLean, R.B.; Beauchamp, J.J.; Kane, V.E.; Singley, P.T. (Oak Ridge National Lab., TN). *Environmental Management;* **6**: No. 5, 431-439(Sep 1982). Contract W-7405-ENG-26.

A model is presented that allows testing of hypotheses concerning the effects of temperature and change in temperature on impingement. The model is evaluated using data from the Tennessee Valley Authority's Kingston Steam Plant, Watts Bar Reservoir, Tennessee, USA for two fish species impinged in large numbers in the United States: threadfin and gizzard shad, Dorosoma petenense and D. cepedianum. Hydrographic characteristics near the intake screens were mapped to help explain the possible role of hydrography in distributing fish across the screens. Understanding the role of temperature and hydrography in impingement of fish provides a basis for new intake designs that may reduce impingement at existing facilities. The temperature modeling approach and conclusions about hydrographic effects might be applied to other systems in which cold-stressed schooling fish are impinged.

2003 Power Transmission And Distribution

REFER ALSO TO CITATION(S) 54093

53863 **(PB—83-209155) Fuel ignition by high voltage capacitive discharges.** Chiu, M.C. (Johns Hopkins Univ., Baltimore, MD (USA)). Mar 1983. 79p. NTIS, PC A05/MF A01.

The study examined the possibility for fuel ignition by spark discharge caused by induction effects under high voltage transmission lines. Theoretical background information on capacitive spark discharges and fuel ignition processes is given. Laboratory experiments were conducted to test the dependence of fuel ignition on three parameters: impedance in discharge path, multiple discharges, and larger electrode shapes. The results of these tests are discussed in terms of fuel ignition possibilities under high voltage transmission lines.

53864 **(PB—83-231571) Guidelines for assessing overview line connectors using infra-red thermovision.** Brailsford, J.R. (Electricity Council Research Centre, Capenhurst (UK)). Aug 1982. 33p. (ECRC/R—1596). NTIS, PC E04/MF E01.

The report is intended as a guide for interpreting infrared (I.R.) thermovision surveys which are employed to identify abnormal temperature rises in connectors installed on the overhead power distribution system. The method utilizes calculations previously developed by the author to convert temperature of a connector as measured in the field to connector resistance, taking account of variables such as windspeed, current loading and connector type. In this way, the resistance limits at which connector replacement is necessary and system losses due to high resistance connectors can be determined from the I.R. data. Graphs are presented from which the rise in temperature at a connector can be compared against criteria developed in previous work which indicate when a connector is unsatisfactory and requires replacement. It is expected however that these criteria may be modified as more experience is gained with I.R. surveys.

53865 **(PB—83-231951) Calculations of the temperature rise of overhead distribution connectors.** Brailsford, J.R. (Electricity Council Research Centre, Capenhurst (UK)). Aug 1982. 59p. (ECRC/M—1595). NTIS, PC E04/MF E01.

An approach was developed for calculating the temperature rise which occurs in many of the connector types in use on the overhead power distribution network and which frequently lead to power losses and the development of faults. The method employed the use of a mathematical model with axial symmetry to derive solutions of the temperature rise of connectors for steady heat flow conditions. By presenting the calculated temperature rises as a function of connector resistance, type and size, current loading and windspeed, the temperature measurements of connectors under field conditions can be related to connector resistance. The model incorporates calculations for through connections, tension terminations and lugs, and tee connections of varying sizes. Resistance criteria have been suggested at which remedial action should be instigated where unsatisfactory connectors are detected in service, taking account of the possibility of failure and power loss.

53866 **Coherency for interconnected power systems.** Sastry, S.; Varaiya, P. (Univ. of California, Berkeley). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Automatic Control;* **AC-26**: No. 1, 218-226(Feb 1981). Contract AS01-78ET29135.

From International symposium on circuits and systems; Houston, TX, USA (Apr 1980).

A model of disturbances affecting power systems is proposed and linearized models of the pre- and post-disturbance dynamics are derived. These are used to study coherency and near coherency of a group of generators under multiple disturbances. The techniques used are based on the geometric theory of linear systems.

21 NUCLEAR POWER PLANTS

53867 **(BNL—33518) Nuclear power plants: structure and function.** Hendrie, J.M. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 45p. (CONF-8304123—1). NTIS, PC A03/MF A01. Order Number DE83017625.

From Symposium on the health aspects of nuclear power plant incidents; New York, NY, USA (7 Apr 1983).

Portions are illegible in microfiche products.

Topics discussed include: steam electric plants; BWR type reactors; PWR type reactors; thermal efficiency of light water reactors; other types of nuclear power plants; the fission process and

nuclear fuel; fission products and reactor afterheat; and reactor safety.

2101 Power Reactors, Non-breeding, Light-water Moderated, Boiling Water Cooled

REFER ALSO TO CITATION(S) 53496, 53505, 53583, 53589, 53893, 53908, 53909, 53944, 53945, 53952, 53986, 53999, 54000, 54001, 54003, 54016, 54019, 54025, 54026, 54027, 54028, 54029, 54030, 54035, 54036, 54039, 54416, 54417, 54431

53868 (CONF-830528—Summ., pp D.II.18-D.II.19) **Experience with fuel damage caused by abnormal conditions in handling and transport.** Bailey, W.J. (Pacific Northwest Lab., Richland, WA). 1983. NTIS, PC A21/MF A01. Contract AC06-76RL01830.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53869 (CONF-830649—3) **Engineering factors influencing Corbicula fouling in nuclear-service water systems.** Henager, C.H.; Johnson, K.I.; Page, T.L. (Pacific Northwest Lab., Richland, WA (USA)). Jun 1983. Contract AC06-76RL01830. 20p. NTIS, PC A02/MF A01. Order Number DE83015991.

From 2. international corbicula symposium; Hot Springs, AR, USA (21 Jun 1983).

Portions are illegible in microfiche products.

Corbicula fouling is a continuing problem in nuclear-service water systems. More knowledge of biological and engineering factors is needed to develop effective detection and control methods. A data base on Corbicula fouling was compiled from nuclear and non-nuclear power stations and industries using raw water. This data base was used in an analysis to identify systems and components which are conducive to fouling by Corbicula. Bounds on several engineering parameters such as velocity and temperature which support Corbicula growth are given. Service water systems found in BWR and PWR reactors are listed and those that show fouling are identified. Possible safety implications of Corbicula fouling are discussed for specific service water systems. Several effective control methods in current use include backflushing with heated water, centrifugal strainers, and continuous chlorination during spawning seasons.

53870 (KURRI-TR—203, pp 71-78) **Investigation of the resonant power oscillation in the Halden Boiling Water Reactor by autoregressive modeling.** Oguma, R. (Japan Atomic Energy Research Inst., Tokai, Ibaraki. Tokai Research Establishment). 1980. (In Japanese). NTIS (US Sales Only), PC A06/MF A01. (CONF-800195—).

From Meeting on statistical phenomena in reactors; Kumatori, Japan (21 Jan 1980).

In the HBWR (Halden Boiling Water Reactor), there exists a resonant power oscillation with period about 0.04 Hz at power levels higher than about 9.5 MWt. While the resonant oscillation in not so large as to affect the normal reactor operation, it is significant, from the viewpoint of reactor diagnosis, to grasp its characteristics and find the cause. Noise analysis based on the autoregressive (AR) modeling technique has been made to reveal the driving source for this oscillation which led to the suggestion that it is attributed to the dynamic interference of heat exchange process between two parallel-connected steam transformers against the reactor. The present study demonstrates that the method used here is highly effective for tracing back to a noise source inducing the variation of quantities in a system, and also applicable to problems of reactor noise analysis and diagnosis.

2102 Power Reactors, Non-breeding, Light-water Moderated, Non-boiling Water Cooled

REFER ALSO TO CITATION(S) 53496, 53505, 53583, 53587, 53589, 53868, 53869, 53908, 53937, 53941, 53944, 53945, 53952, 53986, 53998, 54003, 54004, 54011, 54013, 54019, 54021, 54023, 54027, 54028, 54030, 54032, 54034, 54035, 54036, 54037, 54040, 54416, 54417, 54431, 54432

53871 (CONF-830528—Summ., pp D.II.14-D.II.15) **Transportation of the reactor vessel/internals of retired nuclear power plants as a single package.** Rainisch, R.; Michejda, O. (Burns and Roe Industrial Services Corp., Paramus, NJ). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53872 (CONF-830528—Summ., pp XXIV.11-XXIV.12) **Experience in spent nuclear reactor fuel cells.** Sherman, G. Jr. (EG & G, Inc., Las Vegas, NV); Lopez, C.A.; Neumann, A.T. 1983. NTIS, PC A21/MF A01. Contract AC08-76NV01183;AC08-76NV00410.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53873 (DLCS—5000283) **Quarterly operating report, Second quarter 1983.** (Duquesne Light Co., Pittsburgh, PA (USA)). 1983. Contract AC11-76PN00292. 12p. NTIS, PC A02/MF A01. Order Number DE83017576.

At the beginning of the second quarter of 1983, the Shippingport Atomic Power Station remained shutdown for defueling with one core Removal Cooling Pump in service for decay heat removal and with the Reactor Coolant System depressurized and borated to approximately 6000 ppM boron. In parallel with defueling, the station is being prepared for turnover to a decommissioning agency. During the quarter, the Reactor Pit section of the canal was filled with borated water and the Reactor pit gate was removed in preparation for defueling operations. Also, the 1D Reactor Coolant Loop was isolated from the Reactor Vessel and drained for the upcoming 1D Steam Generator inspection. The 1D Steam Generator secondary side was also drained. The LWBR Core has generated 28,730.41 EFPH from startup through the final shutdown on October 1, 1982.

53874 (DOE/ET/34010—9) **Evaluation and demonstration of methods for improved fuel utilization. Seventh semiannual progress report, October 1, 1982-March 31, 1983.** Decher, U. (C-E Power Systems, Windsor, CT (USA); Omaha Public Power District, NE (USA)). Jun 1983. Contract AC02-79ET34010. 38p. (CEND—413). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83017809.

Portions are illegible in microfiche products.

The objective of this Department of Energy sponsored program is to demonstrate increased burnup for Combustion Engineering's 14x14 fuel design. The program includes the irradiation of extended burnup and low leakage demonstration assemblies with low leakage used to enhance fuel management flexibility for achieving extended burnup. These demonstrations are being performed in the Fort Calhoun reactor located near Omaha, Nebraska. The current program consists of two parts, one to demonstrate low leakage fuel management (SAVFUEL-Shimmed And Very Flexible Uranium Element Loading) and the other to demonstrate extended burnup. The first part will demonstrate that the power duty cycle which is characteristic of SAVFUEL does not have a deleterious effect on fuel performance, while the second part will demonstrate that the maximum rod average burnup of the current 14x14 fuel design can be increased to 56 GWD/T (52 GWD/T Assembly average).

53875 **(MTB—153) Improvement of ISI techniques by multi-frequency eddy current testing method for steam generator tube in PWR plant.** Endo, T.; Kamimura, T.; Nishihara, M.; Araki, Y.; Fukui, S. (Mitsubishi Heavy Industries Ltd., Tokyo (Japan)). May 1982. 10p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703036.

Eddy current flaw detection techniques are applied to the in-service inspection (ISI) of steam generator tubes in pressurized water reactors (PWR) plant. To improve the reliability and operating efficiency of the plants, efforts are being made to develop eddy current testing methods of various kinds. Multi-frequency eddy current testing method, one of new method, has recently been applied to actual heat exchanger tubes, contributing to the improvement of the detectability and signal evaluation of the ISI. The outline of multi-frequency eddy current testing method and its effects on the improvement of flaw detecting and signal evaluation accuracy are described.

53876 **(NUREG—1003) Draft environmental statement related to steam generator repair at H.B. Robinson Steam Electric Plant Unit No. 2, (Docket No. 50-261).** (Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Reactor Regulation). Sep 1983. 44p. NTIS, PC A03/MF A01 - GPO. Order Number DE83910868.

Portions are illegible in microfiche products.

The staff has considered the environmental impacts and economic costs of the proposed steam generator repair at the H.B. Robinson Steam Electric Plant Unit No. 2 along with reasonable alternatives to the proposed action. The staff has concluded that the proposed repair will not significantly affect the quality of the human environment and that there are no preferable alternatives to the proposed action. Furthermore, any impacts from the repair program are outweighted by its benefits.

53877 **(RISLEY-Trans—4352) PWR nuclear power stations in the German Federal Republic: operating experience with pressurized-water plants.** Schenk, H. Translated from *ATW, Atomwirtschaft, Atomtechnik ;* 444-448(Aug-Sep 1980). 12p. NTIS (US Sales Only), PC A02. Order Number DE83902216.

Paper copy only, copy does not permit microfiche production.

The pressurized water reactor is the most commonly used type in the world. After years of exensive operating and accident experience, a confident statistical judgement can now be made of the system. Its operational reliability is reflected in high availability figures. Accident analyses have shown tht the causes can be attributed to a relatively small number of weak points which have generally been replaced by new components or have had their design improved. The 6 reactors operating in the German Federal Republic have achieved operating results which are above the world average. Information is presented concerning PWR reactor availability and operation; performance of reactor components; and reactor safety.

2103 Power Reactors, Non-breeding, Graphite Moderated

REFER ALSO TO CITATION(S) 53529, 53910, 53918, 53985, 54005, 54038

53878 **(IAEA-TC—389/6-2) Task and the technique of temperature instrumentation of HTR's.** Kaiser, G.E. (International Atomic Energy Agency, Vienna (Austria); Brown, Boveri und Cie A.G., Mannheim (Germany, F.R.)). Jun 1982. 8p. (CONF-820653—9). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703025.

From IAEA specialists' meeting on gas-cooled reactor core and high temperature instrumentation; Cumbria, UK (15 Jun 1982).

Design principles of temperature instrumentation of HTGRs are briefly described. Eight groups of temperature measurement positions are indicated.

53879 **(IAEA-TC—389/6-4) Use of chromel-alumel thermocouples in high temperature experiments in WAGR.** Burnett, P.; Ellis, W.E.; Kendal, M. (International Atomic Energy Agency, Vienna (Austria); UKAEA Headquarters, London). Jun 1982. 11p. (CONF-820653—15). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703031.

From IAEA specialists' meeting on gas-cooled reactor core and high temperature instrumentation; Cumbria, UK (15 Jun 1982).

1. Before the prototype Advanced Gas Cooled Reactor at Windscale (WAGR) was finally shut down at the close of its life in June 1981 a programme of concluding experiments, related to certain safety aspects of the Commercial Advanced Gas Cooled Reactors (CAGR), was completed. As part of that programme, some experiments were performed to examine the behaviour of AGR type stainless steel clad fuel pins under postulated operational fault conditions when the peak temperature of the fuel pin cladding approached near to its melting point (1370 deg. C approximately). With this objective, four WAGR fuel stringers were subjected in turn to either a coolant flow or reactor power induced transient lasting a few minutes and sufficient to raise the peak cladding temperature to approximately 1300 deg. C. These experiments were performed in one of the loop systems installed in WAGR which enabled fuel to be irradiated in the reactor core but within a separate pressure tube containment equipped with its own gas cooling system. Thus the in-loop fuel could be operated under temperature conditions different from the rest of the reactor core. 2. This paper is concerned with the thermocouple installation fitted to the experimental stringers to measure the high coolant gas and fuel pin cladding temperatures encountered during the experiments, the method of collecting and checking the data and the performance of the thermocouples during the experiments.

53880 **(IAEA-TC—389/6-5) Fuel temperature measurement in the WAGR.** Thurlbeck, A. (International Atomic Energy Agency, Vienna (Austria); UKAEA Headquarters, London). Jun 1982. 17p. (CONF-820653—16). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703032.

From IAEA specialists' meeting on gas-cooled reactor core and high temperature instrumentation; Cumbria, UK (15 Jun 1982).

Three fuel stringers were loaded into WAGR with the experimental objective of measuring fuel centre temperatures. Twenty four thermocouple assemblies comprising W-26% Re/W-3% Re primary couples with Cr/A1 secondary couples were loaded and operating temperatures of up to 1538 deg. C measured for periods of time ranging up to 2 years. Both thermocouple and fuel pin failures were experienced and the failure mechanisms are described in the text. Finally a design for possible future use in CAGRs is proposed.

53881 **(IAEA-TC—389/6-6) High temperature measurement by noise thermometry.** Decreton, M.C. (International Atomic Energy Agency, Vienna (Austria); Centre d'Etude de l'Energie Nucleaire, Mol (Belgium)). Jun 1982. 18p. (CONF-820653—17). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703033.

From IAEA specialists' meeting on gas-cooled reactor core and high temperature instrumentation; Cumbria, UK (15 Jun 1982).

Noise thermometry has received a lot of attention for measurements of temperatures in the high range around 1000-2000 deg. K. For these measurements, laboratory type experiments have been mostly performed. These have shown the interest of the technique when long term stability, high precision and insensibility to external conditions are concerned. This is particularly true for measurements in nuclear reactors where important drifts due to irradiation effects are experienced with other measurement techniques, as thermocouple for instance. Industrial noise thermometer experiments have not been performed extensively up to now. The subject of the present study is the development of a 1800 deg. K noise thermometer for nuclear applications. The measurement method is based on a generalized noise power approach. The rms noise voltage (Vsub(s)) and noise current (Isub(s)) are successively measured on the resistive sensor. The same quantities are also measured on a dummy short circuited probe (Vsub(d) and Isub(d)). The temperature is then deduced from these measured values by the following

formula: cTsub(s) = (Vsub(s)² - Vsub(d)²)(Vsub(s)/Isub(s) - Vsub(d)/Isub(d))⁻¹, where c is a constant and Tsub(s) the absolute temperature of the sensor. This approach has the particular advantage of greatly reducing the sensibility to environmental perturbations on the leads and to the influence of amplifier noise sources. It also eliminates the necessity of resistance measurement and keeps the electronic circuits as simple as possible.

53882 **(IAEA-TC—389/6-8) Wide range in-core neutron measurement system used in the Windscale AGR concluding experiments.** Goodings, A.; Budd, J.; Wilson, I. (International Atomic Energy Agency, Vienna (Austria); UKAEA Atomic Energy Establishment, Winfrith). Jun 1982. 27p. (CONF-820653—18). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83703034.

From IAEA specialists' meeting on gas-cooled reactor core and high temperature instrumentation; Cumbria, UK (15 Jun 1982).

The Windscale AGR concluding experiments included a comparison of theoretical and experimental power transients and required measurements of neutron flux as a function of position and time within the reactor core. These measurements were specified to cover a working range as wide as possible and had to be made against the in-core gamma background of up to 4 x 10^7 R(hr)$^{-1}$. The detectors were required to operate in special channels cooled by reactor inlet CO_2 and the overall system needed a response time such that it could follow transients with doubling times down to 2s with an accuracy of 2 or 3%. These problems were solved by the use of gas ion fission chambers operating in the current fluctuation or "Campbelling" mode. Their neutron to gamma sensitivity ratio was optimised by the use of unusually low filling pressures and they were fitted with special "trilaminax" mineral insulated cables to minimise the effects of electrical interference at the 100 kHz channel centre frequency. Ten detectors were built and nine were installed in the reactor, three in each of three special stringers at different radial positions. All were processed and tested for operation at 350 deg. C and their fissile coatings (430 μg cm^{-1} of natural uranium) were matched to give individual neutron sensitivities with a population spread better than +- 6% about the mean. The mean absolute sensitivities were determined to about +- 5% against manganese foils in the NESTOR reactor at AEE Winfrith. The detectors were complemented by special signal processing channels which provided current fluctuation sensitivity and appropriate output signals to the experiment data acquisition system. These channels also permitted dc measurement of chamber current for more precise flux determination near reactor full power.

53883 **(IAEA-TC—389/6-10) Detection of flux perturbations in pebble bed HTGRs by near core instrumentation.** Neef, R.D.; Basse, W.; Carlson, D.E.; Knob, P.; Schaal, H.; Wilhelm, H.; Stroemich, A. (International Atomic Energy Agency, Vienna (Austria); Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorentwicklung; Internationale Atomreaktorbau G.m.b.H. (INTERATOM), Bergisch Gladbach (Germany, F.R.)). Jun 1982. 8p. (CONF-820653—3). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703018.

From IAEA specialists' meeting on gas-cooled reactor core and high temperature instrumentation; Cumbria, UK (15 Jun 1982).

For pebble bed reactors an incore monitoring system cannot be utilized during normal operation, mainly for two reasons: (1) The necessary instrumentation cannot withstand possible coolant gas temperatures of up to 1150° C; (2) The detector guide structures cannot withstand the continuous downward movement of the fuel elements in the core and would perturb the loading scheme. Therefore a near-core detector system is necessary which can be used to monitor the power distribution and to recognise perturbations in the neutron flux distribution. This helps guarantee that temperature limits in the core (fuel elements, absorber rods) and in the heat removal systems (steam generators) will not be exceeded. For this purpose an instrumentation system of the following kind is planned (and at least for a prototype reactor no part of it should be omitted): 1) Fast fission chambers in the top reflector for measuring the fast neutron flux distribution; 2) Self powered neutron detectors (SPNDs) in the radial reflector for thermal flux mapping; (3) Thermocouples in the bottom reflector for measuring the profile of the outlet gas temperature.

53884 **(IAEA-TC—389/6-11) Instrumentation of an HTR and its environmental conditions.** Kaiser, G.E. (International Atomic Energy Agency, Vienna (Austria); Brown, Boveri und Cie A.G., Mannheim (Germany, F.R.)). Jun 1982. 5p. (CONF-820653—4). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703019.

From IAEA specialists' meeting on gas-cooled reactor core and high temperature instrumentation; Cumbria, UK (15 Jun 1982).

I and C Safety-Systems and Safety-related Systems (following the definitions in IAEA Safety Guide D8) like the accident monitoring systems have to withstand environmental conditions existing not only during normal operating but also during abnormal operating procedures and accidents. These systems are essential to emergency reactor shutdown, containment isolation, reactor core cooling, and containment and reactor heat removal, or otherwise are essential in preventing significant release of radioactive material to the environment. The technical requirements of these systems are included in the IAEA Safety Guides D3 and D8, in IEEE 279, ANS-4.5, IEC 231 A, KTA 3501, 3502, likewise in national government papers as RSK-Leitlinien for PWR, safety criteria for nuclear power plants of the BMI or NCR-Regulatory Guides. In contrast to PWR's, the harder environment conditions for the instrumentation of an HTR are not always caused by loss of coolant (the "cold gas temperature" of THTR has 260 deg. C) but often by life-steam pipe rupture (steam temperature may be 540 deg. C). There are some ways to protect the instrumentation - above all the transmitters - from these conditions, satisfying also maintenance and inservice inspection requirements. These ways are briefly discussed in the paper.

53885 **(IAEA-TC—389/6-14) Instrumentation of steam cycle HTR's up to 900 MWe.** Leithner, D.E.; Winkenbach, B. (International Atomic Energy Agency, Vienna (Austria); Hochtemperatur-Reaktorbau G.m.b.H., Mannheim (Germany, F.R.)). Jun 1982. 12p. (CONF-820653—5). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703021.

From IAEA specialists' meeting on gas-cooled reactor core and high temperature instrumentation; Cumbria, UK (15 Jun 1982).

Due to basic design features and inherent safety qualities incore instrumentation is not needed in an HTR. Reactor safety requirements can be met by integral measurements. A modest spatial resolving power of the out-of-core instrumentation is sufficient for all operational purposes in small and medium sized steam cycle HTR's. Thus, the instrumentation concept of the THTR 300 MWe prototype reactor can be adopted without major changes for the HTR 450 MWe reactor project, as is demonstrated here for the neutron flux and temperature measurements.

53886 **(IAEA-TC—389/6-15) Core-adjacent instrumentation systems for pebble bed reactors for process heat application - state of planning.** Benninghofen, G.; Serafin, N.; Spillekothen, H.G.; Hecker, R.; Brixy, H.; Serpekian, T. (International Atomic Energy Agency, Vienna (Austria); Internationale Atomreaktorbau G.m.b.H. (INTERATOM), Bergisch Gladbach (Germany, F.R.); Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorentwicklung). Jun 1982. 13p. (CONF-820653—6). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703022.

From IAEA specialists' meeting on gas-cooled reactor core and high temperature instrumentation; Cumbria, UK (15 Jun 1982).

Planning and theoretical/experimental development work for core surveillance instrumentation systems is being performed to meet requirements of pebble bed reactors for process heat application. Detailed and proved instrumentation concepts are now available for the core-adjacent instrumentation systems. The current work and the results of neutron flux measurements at high temperatures are described. Operation devices for long-term accurate gas outlet temperature measurements up to approximately 1423 deg. K will also be discussed.

53887 (IAEA-TC—389/6-16) AVR-pebble-bed reactor: Core-physics control without incore-instrumentation. Krueger, K.; Wagemann, R.; Wimmers, M. (International Atomic Energy Agency, Vienna (Austria); Arbeitsgemeinschaft Versuchs-Reaktor G.m.b.H., Juelich (Germany, F.R.)). Jun 1982. 12p. (CONF-820653—7). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703023.

From IAEA specialists' meeting on gas-cooled reactor core and high temperature instrumentation; Cumbria, UK (15 Jun 1982).

The AVR 15 MWe test power station is equipped with the first high temperature pebble bed reactor. It's He-cooled and Graphite-moderated. Recent developments in the German HTR-area towards modular reactor systems of medium power - consisting of 4 - 6 units of AVR-size - have increased the interest in the operational experience of the AVR significantly. Particular regard aroused on the background of achieving greatest safety, for which we have chosen the subject of our contribution: the core-physics control without incore-instrumentation.

53888 (IAEA-TC—389/6-17) Design of reactor protection systems for HTR plants generating electric power and process heat problems and solutions. Craemer, B.; Dahm, H.; Spillekothen, H.G. (International Atomic Energy Agency, Vienna (Austria); Internationale Atomreaktorbau G.m.b.H. (INTERATOM), Bergisch Gladbach (Germany, F.R.)). Jun 1982. 26p. (CONF-820653—8). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83703024.

From IAEA specialists' meeting on gas-cooled reactor core and high temperature instrumentation; Cumbria, UK (15 Jun 1982).

The design basis of the reactor protection system (RPS) for HTR plants generating process heat and electric power is briefly described and some particularities of process heat plants are indicated. Some particularly important or exacting technical measuring positions for the RPS of a process heat HTR with 500 MWsub(th) power (PNP 500) are described and current R + D work explained. It is demonstrated that a particularly simple RPS can be realized in an HTR with modular design.

53889 (IAEA-TC—389/6-21) Fuel failure detection and location methods in CAGRs. Harris, A.M. (International Atomic Energy Agency, Vienna (Austria); Central Electricity Generating Board, Berkeley (UK). Berkeley Nuclear Labs.). Jun 1982. 18p. (CONF-820653—10). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703026.

From IAEA specialists' meeting on gas-cooled reactor core and high temperature instrumentation; Cumbria, UK (15 Jun 1982).

The release of fission products from AGR fuel failures and the way in which the signals from such failures must be detected against the background signal from uranium contamination of the fuel is considered. Theoretical assessments of failure detection are used to show the limitations of the existing Electrostatic Wire Precipitator Burst Can Detection system (BCD) and how its operating parameters can be optimised. Two promising alternative methods, the 'split count' technique and the use of iodine measurements, are described. The results of a detailed study of the mechanical and electronic performance of the present BCD trolleys are given. The limited experience of detection and location of two fuel failures in CAGR using conventional and alternative methods is reviewed. The larger failure was detected and located using the conventional BCD equipment with a high confidence level. It is shown that smaller failures may not be easy to detect and locate using the current BCD equipment, and the second smaller failure probably remained in the reactor for about a year before it was discharged. The split count technique used with modified BCD equipment was able to detect the smaller failure after careful inspection of the data.

53890 (IWGGCR—5) Specialists' meeting on gas-cooled reactor core and high temperature instrumentation, Windermere, UK, 15-17 June 1982. Summary report. (International Atomic Energy Agency, Vienna (Austria). International Working Group on Gas-Cooled Reactors). Sep 1982. 24p. (CONF-820653—Summ.). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703568.

From IAEA specialists' meeting on gas-cooled reactor core and high temperature instrumentation; Cumbria, UK (15 Jun 1982).

The Specialists' Meeting on "Gas-Cooled Reactor Core and High Temperature Instrumentation" was held at the Beech Hill Hotel, Windermere in England on June 15-17 1982. The meeting was sponsored by the IAEA on the recommendation of the International Working Group on Gas Cooled Reactors and was hosted by the Windscale Nuclear Power Development Laboratories of the UKAEA. The meeting was attended by 43 participants from Belgium, France, Federal Republic of Germany, Japan, United Kingdom of Great Britain and Northern Ireland and the United States of America. The objective of the meeting was to provide a forum, both formal and informal, for the exchange and discussion of technical information relating to instrumentation being used or under development for the measurement of core parameters, neutron flux, temperature, coolant flow etc. in gas cooled reactors. The technical part of the meeting was divided into five subject sessions: (A) Temperature Measurement (B) Neutron Detection Instrumentation (C) HTR Instrumentation - General (D) Gas Analysis and Failed Fuel Detection (E) Coolant Mass Flow and Leak Detection. A total of twenty-five papers were presented by the participants on behalf of their organizations during the meeting. A programme of the meeting and list of participants are given in appendices to this report.

53891 Prestressed concrete reactor vessel research and development studies at the Oak Ridge National Laboratory. Naus, D.J. (Oak Ridge National Lab., TN (USA)). pp 173-178 of Gas-cooled reactors today (vol.1): Operating experience. Engineering experience and developments. Proceedings of the conference held in Bristol on 20-24 September 1982. London, England; British Nuclear Energy Society (1982). (CONF-820915—Vol.1).

From BNES international conference on gas cooled reactors today; Bristol, UK (20 Sep 1982).

The Prestressed Concrete Reactor Vessel research and development program at the Oak Ridge National Laboratory consists of generic studies to provide technical support for ongoing PCRV activities, to contribute to the technological data base, and to provide independent review and evaluation of the relevant technology. Current activities conducted in support of the development of high-temperature gas-cooled reactors include: analysis methods development, concrete property determinations, model testing, and component testing.

53892 Post-irradiation characterization and performance assessment of coated particle fuels. Homan, F.J.; Kania, M.J. (Oak Ridge National Lab., TN (USA)); Stansfield, O.M. (General Atomic Co., San Diego, CA (USA)). pp 161-166 of Gas-cooled reactors today (Vol. 2). Advances in fuel, core and structural materials. Proceedings of the conference held in Bristol on 20-24 September 1982. London, England; British Nuclear Energy Society (1982). (CONF-820915—Vol.2).

From BNES international conference on gas cooled reactors today; Bristol, UK (20 Sep 1982).

A logic diagram of the post-irradiation characterization program currently used in the U.S. HTGR Program is presented. Several of the newer procedures are discussed in detail, including sample results. Examples are given where the fuel performance assessments using data generated by these procedures have produced significant changes in fuel design. It is concluded that the capability is now in place to perform statistically meaningful examinations of irradiated fuel to provide the plant designer with the data to make the necessary performance/economics trade-offs within the primary circuit.

2104 Power Reactors, Non-breeding, Otherwise Moderated Or Unmoderated

REFER ALSO TO CITATION(S) 53593, 53993, 53994, 54007, 54008, 54430, 54436

53893 (CONF-830528—Summ., pp XXIV.17-XXIV.18) **Experience in BWR control rod shipping.** LaBar, M.P.; Webster, L.J. (GA Technologies Inc., San Diego, CA). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

53894 **(IAEA-TC—389/6-25) Development of a device to measure coolant flow within CAGR instrumented fuel stringers.** Ballard, T.D.; Russell, P.S. (International Atomic Energy Agency, Vienna (Austria)). Jun 1982. 13p. (CONF-820653—12). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703028.

From IAEA specialists' meeting on gas-cooled reactor core and high temperature instrumentation; Cumbria, UK (15 Jun 1982).

This paper is concerned with the development work that has been carried out to design a device for the measurement of reactor channel flows and discusses some of the important considerations in terms of design limitations, measurement reliability and accuracy. Various prototype design concepts were studied, with the venturi tube finally adopted as the primary flow measurement device. Incorporation of a venturi tube within a CAGR fuel stringer presents some design difficulties and the consequent form of the device does not adhere to the British Standard. A procedure has therefore been developed for individual calibration and for the derivation of device discharge coefficients over the relevant range of reactor coolant flow conditions. This procedure is described and an appreciation given for the accuracies that can be achieved for venturi tubes used as flow measurement devices in CAGR fuel channels.

53895 (KURRI-TR—203, pp 61-69) **Diagnostic system utilizing the fluctuated detector signals.** Wakabayashi, J. (Kyoto Univ., Uji (Japan). Inst. of Atomic Energy). 1980. (In Japanese). NTIS (US Sales Only), PC A06/MF A01. (CONF-800195—).

From Meeting on statistical phenomena in reactors; Kumatori, Japan (21 Jan 1980).

The diagnostic technique of nuclear power plant will be developed for following four major purposes, and some different techniques will be applied in each purpose, i.e. 1) early detection of specific local failures, 2) detection of the deviation from a designated operation point and estimation of that cause, 3) estimation of inner state variables and prediction of their future trend at after the accident and 4) improvement of the reliability of protection system including the human operation. The present study is concerned with item 2). The diagnostic system proposed us is consisted by three blocks, i.e. detection and classification block utilizing the linear discriminant function technique, disturbance estimation block utilizing the Kalman filtering technique and storage of past detected signals. The results of computer experiments utilizing a PWR plant simulator showed that the classification of present operation state and estimation of disturbance are available with reasonable reliability and reasonable computation time, and this system may also be applied as the diagnostic system of detection system.

2105 Power Reactors, Breeding

REFER ALSO TO CITATION(S) 53473, 53494, 53560, 53912, 53913, 53946, 53947, 53948, 53950, 53951, 53987, 54020, 54027, 54031, 54033

53896 **(FEI—1288) Adaptation of the NF-6 complex programs to the ARAMAKO constants.** Savos'kina, G.V.; Manturov, G.N. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk. Fiziko-Ehnergeticheskij Inst.). 1982. 10p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703092.

The TBKAP computer code realizing formation of files of group cross sections used while neutron-physical calculations of nuclear reactors by means of the NF-6 programs is described. The calculation is performed on the basis of catalogue of microconstants and algorithms of the APAMAKO system. The program consists of subprograms written in the FORTRAN-N. The job packet using the TBKAP computer code is identical to the job packet using the known SINRAR set of computer codes for reactor two-dimensional geometry calculations.

53897 **(HEDL-TME—83-11) Technique for examining the fuel/cladding interface by TEM.** Yang, W.J.S.; Makenas, B.J.; Thomas, L.E. (Hanford Engineering Development Lab., Richland, WA (USA)). May 1983. Contract AC06-76FF02170. 28p. NTIS, PC A03/MF A01. Order Number DE83017990.

Fuel and fission-product interactions with the fuel-pin cladding is an area of concern and has been evaluated in the past principally by in-cell optical metallographic and electron-microprobe examinations. The applicability of three techniques for preparing specimens to reveal the microstructural details and local microchemistry of the fuel/cladding interface under conditions of high-resolution-scanning transmission-electron microscopy has been investigated. The specimen preparation techniques were designed to preserve the fuel/cladding interface and provide and maintain a specimen surface free from smearable alpha contamination. One of the techniques, Ni plating of a fuel cladding sample, preserved the entire cladding cross-section for examination. An Fe-oxide layer on the cladding inner surface was found in specimens prepared by this method. All three techniques of specimen preparation are described in some detail, along with their advantages and disadvantages.

53898 **(IAE—3450/5) Combined method of elements in solving the gas kinetic equation of neutron transport.** Kuz'minov, V.V.; Slesarev, I.S. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1981. 20p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703011.

A new combined method for approximate solving the neutron transport gas kinetic equation based on the formalism of the finite element method and the method of embedded elements is proposed. The algorithm specific feature is the possibility of constructing the rectilinear finite elements by means of which curvilinear boundaries of internal zones can be taken into account precisely. The configuration of these zones is taken into account by embedded elements introduced into corresponding finite elements. The absence in the algorithm of iterations dealing with the scattering integrai reduces calculating expenditures as compared with traditional schemes in solving the gas kinetic equation of neutron transport. The numerical experiments on studying the convergence of the approximate solution to the reference one made for a cell of the BN-1600 type reactor heterogeneous core taken as an example have shown the fast convergence of the method.

53899 (KURRI-TR—203, pp 79-90) **Reactor noise analysis of experimental fast reactor 'JOYO'.** Ohtani, H.; Yamamoto, H. (Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan)). 1980. (In Japanese). NTIS (US Sales Only), PC A06/MF A01. (CONF-800195—).

From Meeting on statistical phenomena in reactors; Kumatori, Japan (21 Jan 1980).

As a part of dynamics tests in experimental fast reactor "JOYO", reactor noise tests were carried out. The reactor noise analysis techniques are effective for study of plant characteristics by determining fluctuations of process signals (neutron signal, reactor inlet temperature signals, etc.), which are able to be measured without disturbances for reactor operations. The aims of reactor noise tests were to confirm that no unstable phenomenon exists in "JOYO" and to gain initial data of the plant for reference of the future data. Data for the reactor noise tests treated in this paper were obtained at 50 MW power level. Fluctuations of process signals were amplified and recorded on analogue tapes. The analysis was performed using noise code (NOISA) of digital computer, with which statistical values of ASPD (auto power spectral density), CPSD (cross power spectral density), and CF (coherence function) were calculated. The primary points of the results are as follows. 1. RMS value of neutron signal at 50 MW power level is about 0.03 MW. This neutron fluctuation is not disturbing reactor operations. 2. The fluctuations of A loop reactor inlet temperatures (T sub(AI)) are larger than the fluctuations of B loop reactor inlet temperature (T sub(BI)). For this reason, the major driving force of neutron fluctuations seems to be the fluctuations of T sub(AI). 3. Core and blanket subassemblies can be divided into two halves (A and B region), with respect to the spacial motion of temperature in the reactor core. A or B region means the region in which sodium temperature fluctuations in subassembly are significantly affected by T sub(AI) or T sub(BI), respectively. This phenomenon seems to be due to the lack of mixing of A and B loop sodium in lower plenum of reactor vessel.

53900 **(PNC-N—241-81-11(3)) Current status of Japanese research and development activity and program plan on failed fuel detection and location systems for LMFBR.** Sekiguchi, N. (Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan)). May 1981. 7p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703047.

Progress of research and development on failed fuel detection and location (FFDL) implemented since 1968 in Japan is summarized and reviewed from the viewpoint of availability to reflect to the design and operation of JOYO and MONJU. These include basic experiments of fission product behavior, component development and testing, feasibility study of detection system response, and comparison of several kinds of location methods. The discussion will extend to the role of FFDL in the other surveillance instruments to secure safety and availability of LMFBR plant. Major concerns in Japan are concentrated on the development tasks of location systems, especially on gas tagging and in- and ex-vessel sipping. Another interest is recently directed to revaluation of the fission product behavior in the primary cooling system and monitor sensitivity to analyze response of FFDL system. Future programs are presented, which is proceeding and under consideration to be performed in JOYO MK-II in order to improve and certify the design of FFDL system for the Japanese fast reactors. An international cooperation in the should be remarked future is considered to be quite important and necessary fully to respond to the development of FFDL system, for LMFBR. A practical proposal to approach this objective will be made.

53901 **(PNC-N—241-81-11(4)) Summary of in-pile loop experiments related to the development of the fuel failure detection systems for LMFBR in Japan.** Sakai, E.; Miyazawa, T.; Sekiguchi, N. (Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan)). May 1981. 13p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703048.

The works on the development of the fuel failure detection systems for LMFBRs using two sodium in-pile loops (SIL and FPL) and one cover gas loop (CGMTF) are summarized. The sodium in-pile loop (SIL) is at the JRR-2 in Tokai Research Establishment, Japan Atomic Energy Research Institute, and contains 8.5 l of sodium. The fission product loop (FPL) is a sodium inpile loop located at the Toshiba Training Reactor in Nuclear Engineering Laboratory, Toshiba Corp., and has 4.8 kg of sodium. The cover gas monitor test facility (CGMTF) is located at the JRR-3 in TRE, JAERI, and various types of cover gas monitors are tested with it. Delayed neutron monitors, moving wire precipitators, cover gas reservoirs-Ge (Li) gamma-ray spectrometers, proportional counter type precipitators and others were tested in these facilities. Some of the results obtained by the above mentioned experiments were used for licensing the operation of the experimental FBR "Joyo", and will be reflected to the design of the prototype FBR "Monju". The experimental data obtained are shown.

53902 **(PNC-N—241-81-11(5)) Gas tagging system development in Japan.** Sekiguchi, N.; Rindo, H.; Akiyama, T.; Miyazawa, T.; Heki, H. (Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan)). May 1981. 23p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703049.

The Gas tagging method has been considered to be most desirable for a failed fuel location system for the fast breeder reactor, regarding the component reduction in the reactor vessel and rapid location during reactor operation. The gas tagging system has been designed by referring to R and D results obtained in Japan and other countries. The designed system is comprised of tag gas filling pins, cover gas sampling system, tag gas recovery and enrichment system, tag gas analyzer and system control and data handling computers. The main specifications for this system have been decided as follows: (1) Main function is location of failed fuels in core and a part of blanket region, (2) Identification capability is each subassembly, (3) Time for identification is within a few days, (4) Continuous operation with automatic start at fuel failure, (5) Detection sensitivity must cover both gas leak and pin burst. In designing the gas tagging system, the following R and D items were selected: (1) System design study, (2) Tag gas capsule development, (3) Modeling the tag gas behavior in reactor primary cooling system, (4) Tag gas recovery and enrichment system, (5) Computer code development for tag gas isotope ratio change estimation. Details of the Japanese gas tagging system development appear in this paper.

53903 **(UJV—5856-T) Experimental investigation of local hydrodynamic characteristics of the peripheral area of a fast reactor fuel assembly. 2. Results of measurements at rated geometry.** Hejna, J.; Vosahlo, L.; Cervenka, J.; Smid, J. (Ustav Jaderneho Vyzkumu CSKAE, Rez (Czechoslovakia)). [nd]. 50p. (In Russian). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83703058.

Aerodynamic model HEM-2 was used for the first stage of experiments aimed at obtaining data allowing to determine the effect of assembly configuration changes on hydrodynamic conditions. The results are given of measuring tangential stresses and velocity fields.

53904 **Axially staggered seed-blanket reactor-fuel-module construction.** Cowell, G.K.; DiGuiseppe, C.P. US Patent Application 6-437,400. 28 Oct 1982. 18p. Contract AC11-76PN00014.

A heterogeneous nuclear reactor of the seed-blanket type is provided wherein the fissile (seed) and fertile (blanket) nuclear fuels are segregated axially within each fuel element such that fissile and fertile regions occur in an alternating pattern along the length of the fuel element. Further, different axial stacking patterns are used for the fuel elements of at least two module types such that when modules of different types are positioned adjacent to one another, the fertile regions of the modules are offset or staggered. Thus, when a module of one type is surrounded by modules of the second type the fertile regions thereof will be surrounded on all sides by fissile material. This provides enhanced neutron communication both radially and axially, thereby resulting in greater power oscillation stability than other axial arrangements.

53905 **Sealing coupling.** Pardini, J.A.; Brubaker, R.C.; Rusnak, J.J. US Patent Application 6-420,070. 20 Sep 1982. 10p. Contract W-31-109-ENG-38.

Disclosed is a remotely operable releasable sealing coupling which provides fluid-tight joinder of upper and a lower conduit sections. Each conduit section has a concave conical sealing surface adjacent its end portion. A tubular sleeve having convex spherical ends is inserted between the conduit ends to form line contact with the concave conical end portions. An inwardly projecting lip located at one end of the sleeve cooperates with a retaining collar formed on the upper pipe end to provide swivel capture for the sleeve. The upper conduit section also includes a tapered lower end portion which engages the inside surface of the sleeve to limit misalignment of the connected conduit sections.

53906 **Core support performance test in the component flow test loop.** Sanders, J.P.; Grindell, A.G.; Eatherly, W.P. (Oak Ridge National Lab., TN (USA)). pp 133-137 of Gas-cooled reactors today (vol.1): Operating experience. Engineering experience and developments. Proceedings of the conference held in Bristol on 20-24 September 1982. London, England; British Nuclear Energy Society (1982). (CONF-820915—Vol.1).

From BNES international conference on gas cooled reactors today; Bristol, UK (20 Sep 1982).

A description is given of the Core Flow Test Loop at Oak Ridge National Laboratory. This is a closed-circuit, out-of-pile loop circulating helium at temperatures and pressures anticipated in gas-cooled reactors. It is operated as part of the Gas-Cooled Fast Reactor programme to determine the performance of core assemblies.

2107 Regulation And Licensing

REFER ALSO TO CITATION(S) 54025, 54026

53907 (NUREG—0540-Vol.5-No.6) Title list of documents made publicly available, June 1-30, 1983. Volume 5 No. 6. (Nuclear Regulatory Commission, Washington, DC (USA). Div. of Technical Information and Document Control). Jun 1983. 579p. NTIS, PC A25/MF A01 - GPO. Order Number DE83910831.

Portions are illegible in microfiche products.

The Title List of Documents Made Publicly Available is a monthly publication. It contains descriptions of the information received and generated by the US Nuclear Regulatory Commission (NRC). This information includes (1) docketed material associated with civilian nuclear power plants and other uses of radioactive materials and (2) nondocketed material received and generated by NRC pertinent to its role as a regulatory agency. As used here, docketed does not refer to Court dockets; it refers to the system by which NRC maintains its regulatory records. This series of documents is indexed by a Personal Author Index, a Corporate Source Index, and a Report Number Index.

53908 (NUREG—0580-Vol.12-No.8) Regulatory licensing status summary report. Volume 12, No. 8. Nuclear power plants data for decisions (blue book), August 1-August 31, 1983. (Nuclear Regulatory Commission, Washington, DC (USA). Office of Resource Management). Sep 1983. 62p. NTIS, PC A04/MF A01 - GPO. Order Number DE83903090.

This management report, regulatory licensing status summary report, is designed to provide the necessary information for controlling the progress of review processes for central station nuclear reactor applications. Section I of this edition consists of the three summary of accomplishments, the new application forecast for OL's and CP's, and an abbreviation key. Section II represents the main body of the report and consists of the facility information. All OL's are listed first, followed by CP's, standard design reviews, other reviews, and finally, a non-power reactor summary. Each project consists of general facility data, current status for all phases of the review, and targeted and actual completion dates for all key milestones in the review.

53909 (UCID—19720) Technical-evaluation report on the monitoring of electric power to the reactor-protection system for the Peach Bottom Atomic Power Station Units 2 and 3 (Docket Nos. 50-277, 50-278. Selan, J.C. (Lawrence Livermore National Lab., CA (USA)). 23 Sep 1983. Contract W-7405-ENG-48. 10p. NTIS, PC A02/MF A01. Order Number DE83017905.

This report documents the technical evaluation of the monitoring of electric power to the reactor protection system (RPS) at the Peach Bottom Atomic Power Station, Units 2 and 3. The evaluation is to determine if the proposed design modification will protect the RPS from abnormal voltage and frequency conditions which could be supplied from the power supplies and will meet certain requirements set forth by the Nuclear Regulatory Commission. The proposed design modifications and Technical Specification changes will provide the required protection for the RPS components from sustained abnormal power.

2108 Economics

REFER ALSO TO CITATION(S) 53912, 53913

53910 (GCRA—83-009) Economic evaluation of the steam-cycle high-temperature gas-cooled reactor. (Gas-Cooled Reactor Associates, San Diego, CA (USA)). Jul 1983. Contract AC03-78SF02034. 182p. NTIS, PC A09/MF A01. Order Number DE83015895.

Portions are illegible in microfiche products.

The High Temperature Gas-Cooled Reactor is unique among current nuclear technologies in its ability to generate energy in temperature regimes previously limited to fossil fuels. As a result, it can offer commercial benefits in the production of electricity, and at the same time, expand the role of nuclear energy to the production of process heat. This report provides an evaluation of the HTGR-Steam Cycle (SC) system for the production of baseloaded electricity, as well as cogenerated electricity and process steam. In each case the HTGR-SC system has been evaluated against appropriate competing technologies. The computer code which was developed for this evaluation can be used to present the analyses on a cost of production or cash flow basis; thereby, presenting consistent results to a utility, interested in production costs, or an industrial steam user or third party investor, interested in returns on equity. Basically, there are two economic evaluation methodologies which can be used in the analysis of a project: (1) minimum revenue requirements, and (2) discounted cash flow.

53911 (IAE—3455/3) Forms of self-supporting relations in the electric power engineering in the presence of nuclear power plants. Shevelev, Ya.V. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1981. 29p. (In Russian). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83703089.

The economic aspects of electric power generation at nuclear power plants connected with the introduction of various forms of self-supporting relations are discussed. A statistical criterium for the evaliation of both nuclear power plant personnel workmanship and administration technical and financial policy correctness is suggested.

2109 Process Heat Reactors

REFER ALSO TO CITATION(S) 53910

22 NUCLEAR REACTOR TECHNOLOGY

2201 Theory And Calculation

53912 (DOE/RL/74032—7) Study of the behavior of actinides continuously recycled in a hard spectrum reactor. Schofield, P.E. (Oregon State Univ., Corvallis (USA). Dept. of Nuclear Engineering). Dec 1980. Contract AT06-76RL74032. 104p. NTIS, PC A06/MF A01. Order Number DE83017453.

Thesis.

The behavior of actinides continuously recycled through the central region of an EBR-II type reactor was studied. Such a reactor would convert long-lived nuclear wastes to short-lived isotopes, and simultaneously produce useful power. This process is proposed as an alternative to the geological isolation of long-lived actinide wastes. A driver region of 50% U-235 enriched fuel provided a nearly-constant spectrum and flux that was extremely hard compared to standard LMFBRs. This resulted in a high fission-to-capture ratio for most isotopes. The original actinide fuel was the discharge from a LWR, cooled for two years, with 99.9% of the uranium and plutonium removed by chemical processing. Comparison was made between removal of both Pu and U and removal of only U in subsequent cycles. The latter case resulted in substantial quantities of trans-plutonics burned per cycle.

53913 (DOE/RL/74032—8) Studies on the properties of hard-spectrum, actinide fissioning reactors. Final report. Nelson, J.B.; Prichard, A.W.; Schofield, P.E.; Robinson, A.H.; Spinrad, B.I. (Oregon State Univ., Corvallis (USA). Dept. of Nuclear Engineering). 1980. Contract AT06-76RL74032. 45p. NTIS, PC A03/MF A01. Order Number DE83017454.

It is technically feasible to construct an operable (e.g., safe and stable) reactor to burn waste actinides rapidly. The heart of the concept is a driver core of EBR-II type, with a central radial target zone in which fuel elements, made entirely of waste actinides are exposed. This target fuel undergoes fission, as a result of which actinides are rapidly destroyed. Although the same result could be achieved in more conventionally designed LWR or LMFBR systems, the fast spectrum reactor does a much more efficient job, by

virtue of the fact that in both LWR and LMFBR reactors, actinide fission is preceded by several captures before a fissile nuclide is formed. In the fast spectrum reactor that is called ABR (actinide burning reactor), these neutron captures are short-circuited.

53914 **(FEI—1300) Capabilities of the BRAND program complex for simulating the neutron-physical experiments by the Monte-Calo method.** Androsenko, P.A.; Androsenko, A.A. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk. Fiziko-Ehnergeticheskij Inst.). 1982. 13p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703093.

The structure and capabilities of the set of programs for simulating the neutron-physical experiments by the Monte Carlo method are described. Geometric modules, evaluation modules source simulating are considered. Combining different modules one can simulate experiments on measurement of integral and differential transmission function, measurement of cross sections of different processes by means of activation as well as time-of-flight methods. There appears the possibility to estimate multiple scattering effects, different containers and other equipment contribution to find detector response functions etc. The complex structure is open and continuously filled up. The constant system employed is oriented to the detailed account of processes of neutron and gamma-quanta interaction with the matter. The set of programs is composed according to the module principle and realized at the BESM-6 computer.

53915 **(IAE—3458/5) Derivation of the finite difference equations for a heterogeneous reactor. 2. Square, triangular and double reactor lattices.** Laletine, N.I.; El'shin, A.V. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1981. 31p. (In Russian). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83703012.

Different approaches to the derivation of the finite difference equations describing the spatial and energy distribution of neutrons in reactor lattices with square, triangular and double configurations are considered. It is shown that the refinement of the finite difference equations for blocks consisting of square cells can be achieved by increasing a number of trial functions. When constructing the equation for a double lattice which represents a combination of fuel element triangular lattice with hexagonal lattice of control rods the lattice may be devided into elementary cells and the equations under consideration are obtained using the conditions of neutron distribution function joining at boundaries between hexagonal and triangular cells.

53916 **(IAE—3491/4) Determination of radiation heating in a critical assembly.** Kuznetsov, V.S.; Molodtsov, A.D.; Tikhonov, L.Ya. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1981. 15p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703013.

The experimental and calculational investigations of radiation heating in fissionableless materials used in thermal heterogeneous reactor channels is out. The character of the heating radial distribution in the zone of an axial reflector is determined. The technique for determining energy release during γ radiation absorption in Be, Zr, Al and Fe based on the Gray theory is developed. The mesurements are performed at the critical assembly representing a strongly heterogeneous system the core of which consists of 108 channels in a water moderator and surrounded by a radial reflector. An ionization chamber of special construction was used for measurements. Calculation of heating is performed according to the QUANTA program which realizes the solution of stationary equation of γ radiation transport in heterogeneous medium by the Monte Carlo method. It is shown that γ radiation flux over the assembly radius in all cross sections by the fuel height and over the height of the assembly for all channels can be described by the same distribution within the limits of 10%. The comparison of experimental and calculational absolute values shows the presence of their systematic divergence within the limits of 30%. It is concluded that the data obtained permit to perform correction of the methods and programs for heating calculation and have a practical advantages when solving the problems of heat release profiling in the reactor core.

53917 **(IAE—3582/5) Program for neutron group calculation of a plane periodical reactor cell using the difference analog of the surface pseudosource method NEGR-PR.** Boyarinov, V.F. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1982. 28p. (In Russian). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83703567.

The NEGR-PR program intended for multigroup calculation of a multizone plane periodic reactor cell is described. Program is written in the ALGOL and adapted for the BESM-6 computer. The calculational algorithm based on solving the neutron transport equation with isotropic scattering by means of the modified pseudosource method is described. The program provides calculation of mean fluxes in zones, boundary fluxes and mean flux over the cell.

53918 **(Juel—1809) Investigation of a high-temperature reactor with a central region of graphite-spheres.** Wang, D. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorentwicklung; Technische Hochschule Aachen (Germany, F.R.)). Oct 1982. 81p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83751054.

The HTR-modul is a pebble-bed reactor with small power and characterized by good inherent safety. In order to increase the power of the HTR-modul a new concept of the reactor core is proposed with a central region of graphite spheres. Further, the parameters are studied which influence the max. temperature of the fuel elements at a loss-of-coolant-accident. These are the reactor power; the power density; the diameter of the inner graphite-sphere-region; the graphite-noses; the radial power distribution; the rate of fuel element loading; etc. From this parametric study the sensitive factors are identified for an increase of the reactor power. A reference design of a reactor power unit of 500 MWt is studied. The HTR-modul-500 has a core diameter of 5,2 m, a diameter of central graphite-sphere-region of 1,2 m, a two-zone-core and six graphite-noses. For this reference design the max. temperature of the fuel elements stays limited to 1553°C in the case of an extreme loss of coolant accident.

53919 (KURRI-TR—203, pp 37-52) **Derivation of Pal-Bell equations for two-point reactors, and its application to correlation measurements at KUCA.** Murata, N.; Yamane, Y.; Nishina, K. (Nagoya Univ. (Japan). Faculty of Engineering); Shiroya, S.; Kanda, K. 1980. (In Japanese). NTIS (US Sales Only), PC A06/MF A01. (CONF-800195—).

From Meeting on statistical phenomena in reactors; Kumatori, Japan (21 Jan 1980).

A probability is defined for an event in which m neutrons exist at time t sub(f) in core I of a coupled-core system, originating from a neutron injected into the core I at an earlier time t; we call it P sub(I,I,m)(t sub(f)/t). Similarly, P sub(I,II,m)(t sub(f)/t) is defined as the probability for m neutrons to exist in core II of the system at time t sub(f), originating from a neutron injected into the core I at time t. Then a system of coupled equations are derived for the generating functions G sub(Ij)(z, t sub(f)/t) = ΣP sub(Ijm)(t sub(f)/t).z sup(m), where j = I, II. By similar procedures equations are derived for the generating functions associated with joint probability of the following events: a given combination of numbers of neutrons are detected during given series of detection time intervals by a detector inserted in one of the cores. The above two kinds of systems of equations can be regarded as a two-point version of Pal-Bell's equations. As the application of these formulations, analyzing formula for correlation measurements, namely (1) Feynman-alpha experiment and (2) Rossi-alpha experiment of Orndoff-type, are derived, and their feasibility is verified by experiments carried out at KUCA.

53920 (KURRI-TR—203, pp 13-19) **Study of the stochastic point reactor kinetic equation.** Gotoh, Y. (Japan Atomic Energy Research Inst., Tokai, Ibaraki. Tokai Research Establishment). 1980. (In Japanese). NTIS (US Sales Only), PC A06/MF A01. (CONF-800195—).

From Meeting on statistical phenomena in reactors; Kumatori, Japan (21 Jan 1980).

Diagrammatic technique is used to solve the stochastic point reactor kinetic equation. The method gives exact reaults which are derived from Fokker-Plank theory. A Green's function dressed with the clouds of noise is defined, which is a transfer function of point reactor with fluctuating reactivity. An integral equation for the correlation function of neutron power is derived using the following assumptions: 1) Green's funntion should be dressed with noise, 2) The ladder type diagrams only contributes to the correlation function. For a white noise and the one delayed neutron group approximation, the norm of the integral equation and the variance to mean-squared ratio are analytically obtained.

53921 (KURRI-TR—203, pp 21-30) **Detection of interactions between wave components at different frequencies of a random signal.** Kuroda, Y. (Tokai Univ., Tokyo (Japan). Faculty of Engineering). 1980. (In Japanese). NTIS (US Sales Only), PC A06/MF A01. (CONF-800195—).

From Meeting on statistical phenomena in reactors; Kumatori, Japan (21 Jan 1980).

Interactions between wave components at different frequencies of a random signal can not be identified by the power spectrum but by higher order spectra. Practically available higher order spectra are primarily the bispecrum which is the two dimensional expression of the third order spectrum and the criss power spectrum which is the separete one dimensional expression of higher order harmonics. In this paper the relationship between these two spectrum are considered, giving some aspects from simulation- and reactor noise data.

53922 **(UJV—6232-T) Mesh generation for fast reactor fuel assembly in velocity and temperature field calculations using finite element method.** Schmid, J. (Ustav Jaderneho Vyzkumu CSKAE, Rez (Czechoslovakia)). Oct 1982. 115p. (In Czech). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83703059.

A set of computer codes for triangular six-node finite element mesh generation in fast reactor fuel assemblies (or their parts) is described as are directions for input data preparation and operator's actions. The generated meshes are utilized for velocity and temperature calculations.

53923 **Evaluation and modification of the probability table method for bubble reactivity worth calculations.** Hoffman, T.J. (Oak Ridge National Laboratory, Computer Sciences Division, Oak Ridge, Tennessee 37830). *Nuclear Science and Engineering;* **82**: No. 2, 224-228(Oct 1982).

The probability table representation of neutron transport in bubbly media, developed by Hoffman and Petrie for neutron flights initiated by collision, is extended to neutron flights initiated at interfaces. Both forms are compared with appropriate Monte Carlo estimates of one-flight transmission through bubbly slabs, with encouraging results for slabs thicker than the bubble diameter. These forms are then combined into a modified probability table method. Application of the modified method to transport calculations requires high spatial and angular resolution but shows that the interface modification can have a substantial effect on calculated bubble worths. Fortunately, the results agree well with the simple Benoist method, which does not require high resolution.

53924 **Eigenvalue-dependent neutron energy spectra: Definitions, analyses, and applications.** Cacuci, D.G.; Ronen, Y.; Shayer, Z.; Wagschal, J.J.; Yeivin, Y. (Oak Ridge National Laboratory, Engineering Physics Division, P.O. Box X, Oak Ridge, Tennessee 37830). *Nuclear Science and Engineering;* **81**: No. 3, 432-442(Jul 1982).

A general qualitative analysis of spectral effects that arise from solving the κ-, α-, γ-, and σ-eigenvalue formulations of the neutron transport equation for nuclear systems that deviate (to first order) from criticality is presented. Hierarchies of neutron spectra softness are established and expressed concisely in terms of the newly introduced spatialdependent local spectral indices for the core and for the reflector. It is shown that each hierarchy is preserved, regardless of the nature of the specific physical mechanism that cause the system to deviate from criticality. Qualitative conclusions regarding the general behavior of the spectrum-dependent integral spectral indices and ICRs corresponding to the κ-, α-, γ-, and σ-eigenvalue formalisms are also presented. By defining spectral indices separately for the core and for the reflector, it is possible to account for the characteristics of neutron spectra in both the core and the reflector. The distinctions between the spectra in the core and in the reflector could not have been accounted for by using a single type of spectral index (e.g., a spectral index for the entire system or a spectral index solely for the core).

53925 **Particle and radiation leakage importance: definition, analysis, and interpretation.** Cacuci, D.G.; Wagschal, J.J.; Yaari, A. (Oak Ridge National Laboratory, Engineering Physics Division, P.O. Box X, Oak Ridge, Tennessee 37830). *Nuclear Science and Engineering;* **81**: No. 3, 443-450(Jul 1982).

The concept of leakage importance function has been introduced and analyzed for physical systems governed by the Boltzmann transport equation. This leakage importance function represents a measure of the relative importance of source particles located at every point in phase space in contributing to the leakage and provides insight regarding the specific physical process that leads to leakage. The equation satisfied by the leakage importance function has been derived by using adjoint operators. It has been shown that procedures that are customarily used to derive an equation obeyed by an importance function suitable for an integral parameter such as a detector response or an eigenvalue lead to difficulties when directly applied to derive an equation obeyed by the leakage importance function. This is because, although leakage is also an integral parameter (i.e., a functional of the forward flux density), leakage is expressed in terms of a surface integral rather than in terms of volume integrals such as those appearing in expressions of detector responses or eigenvalues. Therefore, a procedure that departs from the customary course has been devised to derive the equation satisfied by the leakage importance function.

53926 **STP: A mathematically and physically consistent library of steam properties.** Aguilar, F.; Hutter, A.C.; Tuttle, P.G. (EG & G Idaho, P.O. Box 1625, Idaho Falls, Idaho 83415). *Nuclear Science and Engineering;* **81**: No. 3, 467-471(Jul 1982).

A new FORTRAN library of subroutines has been developed from the fundamental equation of Keenan et al. to evaluate a large set of water properties including derivatives such as sound speed and isothermal compressibility. The STP library uses the true saturation envelope of the Keenan et al. fundamental equation. The evaluation of the true envelope by a continuation method is explained. This envelope, along with other design features, imparts an exceptionally high degree of thermodynamic and mathematical consistency to the STP library, even at the critical point. Accuracy and smoothness, library self-consistency, and designed user convenience make the STP library a reliable and versatile water property package.

53927 **Cross-section adjustment with Monte Carlo sensitivities: Application to the Winfrith iron benchmark.** Hall, M.C.G. (Oak Ridge National Laboratory, P.O. Box X, Oak Ridge, Tennessee 37830). *Nuclear Science and Engineering;* **81**: No. 3, 423-431(Jul 1982).

The Monte Carlo analysis of the Winfrith Iron Benchmark required about 2h computing time on an IBM 3033; the discrete ordinates analysis required an order of magnitude more than this. The Winfrith Iron Benchmark had relatively simple geometry; for more complicated geometries the difference in computing times is expected to become even more significant. For integral measurements taken in complex situations such as a power reactor, the Monte Carlo adjustment procedure presented in this work may be the only one that is feasible. Other advantages pertinent to this method are that the removal of bias factors gives less opportunity for subjective judgment to influence the adjustment procedure and that the use of point nuclear data makes it clear that the adjustments are not simply compensating for group averaging errors. This work enables adjustment procedures to be applied more efficiently, more generally, and more reliably.

2202 Components And Accessories

53928 **(FEI—1299) Reactivity meter for collective use on the base of the Electronica-100I computer.** Bondarenko, V.V.; Grachev, A.V.; Kanunnikov, Yu.S.; Kulabukhov, Yu.S.; Markin, V.V.; Timokhin, L.A.; Chajka, Yu.V. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk. Fiziko-Ehnergeticheskij Inst.). 1982. 19p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703014.

An automated system for measuring reactivity of nuclear reactors is described. The main formulae used for calculations and the system and service computer code flowsheets are given. The system under consideration permits the independent real time measurements for four users simultaneously. Reactivity is calculated on the base of the reactor kinetics equation inverse solution. The system includes the Electronica-100I computer, a generator of timing channel width and four user channels. A user channel consists of a measurement subchannel and a subchannel for data input/output. The system software is made as a set of modules. The software modules are written in the symbol programming and FORTRAN languages. Experimental use of the described system has shown that it is convenient for users and permits to conduct necessary measurements with high efficiency.

53929 **(HEDL—7387) Swelling of high-nickel Fe-Ni-Cr alloys in EBR-II (Contribution to DAFS quarterly).** Brager, H.R. (Hanford Engineering Development Lab., Richland, WA (USA)). 1976. Contract AC06-76FF02170. [nd]p. NTIS, PC A02/MF A01. Order Number DE83018209.

The objective of this effort is to identify the origins of the compositional dependence of swelling in simple ternary alloys. Swelling data on Fe-Ni-Cr alloys with nickel in the 35 to 75 wt % range has been obtained to fluences as large as 2.2×10^{23} n/cm^2 ($E > 0.1$ MeV) ($\sim$ 110 dpa). At 15% chromium the swelling rate at 35, 45 and 75% nickel continues to increase with accumulating exposure, most clearly approaching 1%/dpa at $\sim$ 35% nickel. The minimum often observed in swelling at $\sim$ 45% nickel appears to be due to a maximum in the duration of the transient regime at this composition. Decreasing the chromium level from 15 to 7.5% extends the transient regime even further.

53930 **(IAEA-TC—389/6-3) TWIST: a computer program to calculate errors due to degradation of insulation resistance of mineral insulated thermocouple cables.** Gentry, P.J.; Burnett, P. (International Atomic Energy Agency, Vienna (Austria); UKAEA Headquarters, London). Jun 1982. 38p. (CONF-820653—14). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83703030.

From IAEA specialists' meeting on gas-cooled reactor core and high temperature instrumentation; Cumbria, UK (15 Jun 1982).

At temperatures in excess of 800 deg. C the insulation resistance of an MI thermocouple cable may be so low that significant leakage current flows between the conductors, resulting in an error in the measured junction temperature: this error may be as great as the difference between junction and maximum cable temperatures. Because it is not always possible to route cables to avoid regions of high temperature a method for calculating the resultant error has been developed. The computer program, TWIST, described in this paper, developed from an existing solution, can be used to calculate the error together with loop and insulation resistance. A number of measurements of error, loop and insulation resistance are described and the results are compared with calculations. The wide range of values for the resistivity of commercial MgO insulant in the literature, attributed to variations in concentration of contaminants, is reflected in the current work. It has been found necessary to establish the resistivity of each cable by measurement over the operational temperature range in order to predict in-service error reliably.

53931 **(IAEA-TC—389/6-26) In-core flow measurement and calibration of gags using on-load instrumented stringers in a C.A.G.R. at Hinkley Point 'B'.** Harrison, W.E.; Abbott, D.G.; Carrick, I.H. (International Atomic Energy Agency, Vienna (Austria)). Jun 1982. 19p. (CONF-820653—13). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703029.

From IAEA specialists' meeting on gas-cooled reactor core and high temperature instrumentation; Cumbria, UK (15 Jun 1982).

The initial fuel loading of the first CAGR at Hinkley Point included 5 specially instrumented stringers (OLIS) each containing a flow-measuring venturi and additional thermocouples. Venturi absolute and differential pressures were measured by transducers mounted on the pile-cap. Transducers and thermocouples were routed to a computer/logger and processed into stringer performance data. The venturi was engineered to comply closely with appropriate British Standards but compromises were made to minimise interaction with other functions of the OLIS plug unit, justifying rig calibration of venturis to check for deviation in behaviour. High accuracy and reliability of the flow measuring system were established by thorough commissioning procedures. The transducers were selected for low sensitivity to their operational environment. Nevertheless calibration of all transducers was carried out both in laboratory and in-situ. Errors introduced by signal processing were identified and zero drift monitored. Pipe-runs were scrupulously leak-tested and leak sensitivity was evaluated. After one year re-calibration and recommissioning gave confidence of long term stability. Measurements of stringer behaviour were collected in a series of tests spanning the full range of both the setting of the channel flow control gags and the reactor power. Throughout these tests comprehensive monitoring, with intercalibration between the OLIS and comparison with installed reactor instrumentation has quantified residual error. These measurements were used to check the theoretical model used by the station for channel flow assessment. The excellent agreement obtained justified proceeding to the derivation of a universal gag resistance calibration applying to all power levels.

53932 **Valve for controlling solids flow.** Staiger, M.D. US Patent Application 6-426,446. 29 Sep 1982. 13p. Contract AC07-79ID01675.

A valve for controlling the flow of solids comprises a vessel having an overflow point, an inlet line for discharging solids into the vessel positioned within the vessel such that the inlet line's discharge point is lower than the vessel's overflow point, and means for introducing a fluidizing fluid into the vessel. The fluidizing fluid fluidizes the solids within the vessel so that they overflow at the vessel's overflow point. For the removal of nuclear waste product the vessel may be placed within a sealed container having a bottom connected transport line for transporting the solids to storage or other sites. The rate of solids flow is controlled by the flow rate of the fluidizing fluid and by V-notch weirs of different sizes spaced about the top of the vessel.

53933 **(CE-Trans—7880) Safety engineering: KTA Code of Practice. Lifting mechanisms in nuclear plant.** (Central Electricity Generating Board, London (UK); Kerntechnischer Ausschuss (KTA), Koeln (Germany, F.R.)). [nd]. Translation of KTA 3920, 6/78 edition. 21p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83902753.

Lifting mechanisms must be constructed and operated in accordance with current safety regulations in particular the Industrial Protection Regulations issued by the German Federal Republic and the Lander, and also in accordance with the regulations of the Public Accident Insurance Organization. Generally recognized Code of Practice must be taken into account.

2203 Fuel Elements

53934 **Improved encapsulated fuel unit and method of forming same.** Groh, E.F.; Cassidy, D.A.; Lewandowski, E. US Patent Application 6-415,117. 7 Sep 1982. 19p. Contract W-31-109-ENG-38.

This invention teaches an encapsulated fuel unit for a nuclear reactor, such as for an enriched uranium fuel plate of thin cross section of the order of 1/64 or 1/8 of an inch and otherwise of rectangular shape 1 to 2 inches wide and 2 to 4 inches long. The case is formed from (a) two similar channel-shaped half sections extended lengthwise of the elongated plate and having side edges butted and welded together to define an open ended tube-like structure and from (b) porous end caps welded across the open ends of

the tube-like structure. The half sections are preferably of stainless steel between 0.002 and 0.01 of an inch thick, and are beam welded together over and within machined and hardened tool steel chill blocks. The porous end caps preferably are of T-316-L stainless steel having pores of approximately 3 to 10 microns size.

2204 Control Systems

REFER ALSO TO CITATION(S) 54556

53935 (CONF-821005—, pp III.37-III.49) **Experience in treatment of components, waste treatment, packaging and shipping related to decommissioning.** Christ, B.; Schneider, K.A.; Vygen, P. 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

Common practice of the treatment of large amounts of activated core components, contaminated components and waste treatment is described. Single tasks of actual repair and backfitting work comprise up to 800 tons of material to be removed, packed, shipped and decontaminated. Decontamination for unrestricted release has already been successfully performed. Special container systems for shipment and storage of every kind of radioactive waste are presented. Containers resulting in maximum shipping, storage and disposal capacity as well as shipping and storage casks for canned and uncanned fuel are described. The experience gained with nuclear facilities in Europe is correlated to the decommissioning tasks to be performed in the near future. 7 figures.

53936 **(IAE—3442/15) Graphics display devices for an information measurement system of a research reactor.** Gavrilin, V.A.; Kirillov, A.A.; Mozhaev, A.A.; Najdin, Yu.V.; Novokshchenova, E.A.; Utochkin, B.A.; Shamsuarov, A.D.; Shitikov, B.I. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1981. 20p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703094.

The problems connected with using in the experiment automation systems of graphic information display are discussed. The concrete information measurement system of the research material technologic reactor in which the graphic display at the cathode-ray storage tube with a functionaliy sensor panel is considered. The functional purpose of the graphic display units, functionally-sensor panel and M-6000 computer display conjugation unit as well as software modules is described. The considered display serves for display of the present-day state of technological reactor systems and loop channels, technological reactor systems and loop channels in the given time interval within the limits of 48 h resource variations of one or several parameters at the present moment or in any time interval within the limits of 48 h. It is concluded that using developed program and apparatus facilities ensuring the operator and computer interactive operating conditions in the automated control system by the research reactor considerably improves the quality and efficiency of experimental studies.

53937 **(IAE—3451/5) BIPRUS code.** Krajnov, Yu.A.; Kosourov, K.B. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1981. 50p. (In Russian). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83703035.

The BIPRUS computer code which is the modified BIPR-5 code version intended for calculating neutron-physical characteristics of the water cooled and moderated reactor cores with the "cluster" type control elements used in the WWER-1000 type reactors is described. Basic regimes realized in the code ("Control element efficiency", "Criticality calculation", "Control element driving according to the code") and the rules of a variant description are considered. The capabilities provided in the code in order to simplify its operation and accelerate the obtained result processing as well as the PETRA service codes realizing data processing are described. The BIPRUS code is written in the FORTRAN language for the BESM-6 computer with the "Dubna" monitoring system.

53938 **(IAEA-TC—389/6-24) Acoustic system for pipe rupture monitoring and leak detection.** Herzog, W.; Jonas, H. (International Atomic Energy Agency, Vienna (Austria); Hochtemperatur-Reaktorbau G.m.b.H., Mannheim (Germany, F.R.); Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorentwicklung). Jun 1982. 8p. (CONF-820653—11). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703027.

From IAEA specialists' meeting on gas-cooled reactor core and high temperature instrumentation; Cumbria, UK (15 Jun 1982).

As a safety aspect pipe rupture and leakage effects are of particular interest in nuclear power plants where severe consequences for the reactor may result. Counter measures against postulated pipe breaks and leakages in nuclear power plants are necessary whenever the main safety goals: safe shut-down, safe afterheat removal and retention of radioactivity, are endangered. The requirements to be met by a leak detection system depend on the time available for counter actions. If this time is short so that automatic actions are necessary the German safety criteria for nuclear power plants (Criterion 6.1) require two physically diverse signals to be monitored. One fairly obvious possibility of leak detection is to monitor process parameters (pressure, flow). As a diverse signal physical parameters outside the process may be employed: pressure transients temperature, humidity are principally suitable. In practical application, however, it is difficult to predict these parameters by way of calculation in order to establish the required set-point of the monitoring system. Experimental determination is possible only in special cases. A study of several ways of diverse leak detection methods leads to the very promising acoustic method. We investigated experimentally the feasibility of monitoring the sound created by a leakage. Air borne sound as well as body borne sound was analyzed.

53939 **(ITEF—94(1982)) Software for the AIST measurement and calculational complex. Service routines for editing and statistical processing files on a magnetic tape.** Kaspin, A.I.; Sokolov, V.L. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Teoreticheskoj i Ehksperimental'noj Fiziki). 1982. 20p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703096.

New sevice routines aimed at statistical processing the information necessary for evaluating the efficiency of the AIST-1 measurement and calculational complex operation are described. The routine flowsheets consideration prepare all information on the complex monthly operation in one listing in the form of a summary table and histograms. The capability of editing defect files on a magnetic tape is also provided which gives an opportunity to increase the operator productivity in 2-3 times.

53940 **(JINR—R-13-82-533) System for correlational and spectral measurements of IBR-2 reactor parameters.** Vagov, V.A.; Zamrij, V.N.; Ishmukhametov, M.Z.; Pepelyshev, Yu.N.; Savvateev, A.S.; Salamatin, I.M.; Shabalin, E.P. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics). 1982. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703060.

The method is considered of correlational and spectral mesurements of about 20 principal parameters of the core, of the reactivity modulator, of the first circuit of liquid sodium cooling system and of control units of the IBR-2 pulsed reactor in order to study the conditions for safe and stable operation of the reactor. The structure is considered of the measuring system based on a computer compatible with the mini-computer of the CM-3 type and devices in CAMAC standard. Its software is also discussed. Several results are reported of the measurements performed during the physical startup and power startup of the IBR-2 reactor.

53941 **(KFKI—1982-111) Analog reactivity meter developed from modules of the instrument system for nuclear industry.** Baranyai, A.; Zsido, J. (Hungarian Academy of Sciences, Budapest. Central Research Inst. for Physics). Jan 1983. 24p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703448.

Reactivity is one of the most important parameters in the control of nuclear reactors. An analog reactivity meter was elaborated from the modules of Instrument System for Nuclear Industry. The report describes the theoretical principles, main elements, calibration and measuring experiences of the analog reactivity meter built from the modules of Instrument System for Nuclear Industry.

53942 **(KFKI—1983-09) Application of function generator for checking reactivity meter accuracy.** Baranyai, A.; Zsido, J. (Hungarian Academy of Sciences, Budapest. Central Research Inst. for Physics). Feb 1983. 10p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703449.

The accuracy of reactivity meters is usually checked with a reactor kinetic simulator operating to an accuracy exceeding the expected accuracy of the measuring device. The present report describes a method to evaluate accuracy by comparing the response R(t) of the reactivity meter to a given function n(t) with the value of the reactivity function r(t) calculated from the same input function instead of using the input reference signal r(t) to the simulator with the output signal R(t) from the reactivity meter. This method has been successfully used by applying sawtooth and exponential input signals for the determination of the accuracy of reactivity meters developed in the Central Research Institute for Physics.

53943 **(KURRI-TR—203, pp 31-36) Identification of nuclear reactor characteristics by the reactor noise analysis.** Yashima, H. (Niigata Univ., Nagaoka (Japan). Faculty of Engineering). 1980. (In Japanese). NTIS (US Sales Only), PC A06/MF A01. (CONF-800195—).

From Meeting on statistical phenomena in reactors; Kumatori, Japan (21 Jan 1980).

Reactor noise analysis method was applied to TRIGA II Research Reactor (Atomic Research Laboratory, Musashi Institute of Technology) and computed power spectral density (PSD) from the CIC current record. PSD has provided many valuable informations regarding to the reactor kinetics, including the effect of control rods vibration. Another information of neutron physics parameters were obtained and this result was compared with the parameter which was formerly measured by the Feynman-α experiment. Through these experiments we could find overall frequency characteristics of TRIGA II Reactor.

53944 **(NUREG/CR—3371-Vol.1) Task analysis of nuclear-power-plant control-room crews: project approach methodology.** Burgy, D.; Lempges, C.; Miller, A.; Schroeder, L.; Van Cott, H.; Paramore, B. (General Physics Corp., Columbia, MD (USA); BioTechnology, Inc., Falls Church, VA (USA)). Sep 1983. 257p. (GP-R—221020-Vol.1). NTIS, PC A12/MF A01 - GPO $6.50. Order Number DE83910862.

Portions are illegible in microfiche products.

A task analysis of nuclear-power-plant control-room crews was performed by General Physics Corporation and BioTechnology, Inc., for the Office of Nuclear Regulatory Research. The task-analysis methodology used in the project is discussed and compared to traditional task-analysis and job-analysis methods. The objective of the project was to conduct a crew task analysis that would provide data for evaluating six areas: (1) human-engineering design of control rooms and retrofitting of current control rooms; (2) the numbers and types of control-room operators needed with requisite skills and knowledge; (3) operator qualification and training requirements; (4) normal, off-normal, and emergency operating procedures; (5) job-performance aids; and (6) communications. The data-collection approach focused on a generic structural framework for assembling the multitude of task data that were observed. The results of the data-collection effort were compiled in a coputerized task database. Six demonstrations for suitability analysis were subsequently conducted in each of the above areas and are described in this report.

53945 **(NUREG/CR—3371-Vol.2) Task analysis of nuclear-power-plant control-room crews.** Burgy, D.; Lempges, C.; Miller, A.; Schroeder, L.; Van Cott, H.; Paramore, B. (General Physics Corp., Columbia, MD (USA); BioTechnology, Inc., Falls Church, VA (USA)). Sep 1983. 345p. (GP-R—221020-Vol.2). NTIS, PC A15/MF A01 - GPO $8.00. Order Number DE83910813.

A task analysis of nuclear-power-plant control-room crews was performed by General Physics Corporation and BioTechnology, Inc., for the Office of Nuclear Regulatory Research. The task analysis methodology used in the project is discussed and compared to traditional task-analysis and job-analysis methods. The objective of the project was to conduct a crew task analysis that would provide data for evaluating six areas: (1) human engineering design of control rooms and retrofitting of current control roooms, (2) the numbers and types of control room operators needed with requisite skills and knowledge, (3) operator qualification and training requirements, (4) normal, off-normal, and emergency operating procedures, (5) job performance aids, and (6) communications. The data collection approach focused on a generic structural framework for assembling the multitude of task data that were observed. The results of the data-collection effort were compiled in a computerized task database. Results including a description of the computerized task analysis data format.

53946 **(PNC-N—941-81-114) Current status on the development of sodium boiling detection system in Japan.** Araki, H.; Komaba, T.; Sano, K.; Ozaki, Y.; Inuzima, H. (Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan)). 1981. 9p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703055.

Some studies for confirmation of the usefulness of the measurements of boiling sound and fluctuations of sodium temperature, flowrate and neutron flux for detection of sodium boiling have been curried out in Japan. For the development of acoustic detection system, acoustic transmission decay and velocity change by fuel pins, gas plenum and neutron shield were measured. Acoustic transmission from the reactor core to the detectors which were installed in the upper core structure and the upper flange of reactor vessel were studied theoretically and experimentally using the reactor vessel mockup. Sodium boiling acoustic spectra which were dependent of detector positions were obtained in the out-of-pile experimental facility. Acoustic background caused by flow and electric noise were measured in the Experimental Fast Reactor. On the other hand, coolant temperature and flowrate fluctuations caused by the sodium boiling were measured by the Temp/Flow detector which were mounted on the outlet of fuel subassembly. Simulation tests by computer on the correlation method between neutronic and acoustic signals were carried out. Current status and future plans about these studies in Japan are summarized briefly in this paper.

53947 **(PNC-N—941-81-115) Transmission experiment by the simulated LMFBR model and propagation analysis of acoustic signals.** Kobayashi, K.; Yasuda, T.; Araki, H. (Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan)). 1981. 15p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703056.

Acoustic transducers to detect a boiling of sodium may be installed in the upper structure and at the upper position of reactor vessel wall under constricted conditions. A set of the experiments of transmission of acoustic vibration to various points of the vessel was performed utilizing the half scale-hydraulic flow test facility simulating reactor vessel over the frequency range 20 kHz -- 100 kHz. Acoustic signals from an installed sound source in the core were measured at each point by both hydrophones in the vessel and vibration pickups on the vessel wall. In these experiments transmission of signals to each point of detectors were clearly observed to background noise level. These data have been summarized in terms of the transmission loss and furthermore are compared with background noise level of flow to estimate the feasibility of detection of sodium boiling sound. The ratio of signal to noise was obtained to be about 13 dB by hydrophone in the upper structure, 8 dB by accelerometer and 16 dB by AE-sensor at the upper position on the vessel in experiments used the simulation model. Sound waves emanated due to sodium boiling also propagate along the wall of the vessel may be predicted theoretically. The result of analysis suggests a capability of detection at the upper position of the reactor vessel wall. Leaky Lamb waves of the first symmetric (L_1) and of the antisymmetric (F_1) mode and shear horizontal wave (SH) have been derived in light of the attenuation due to coupling to liquid sodium as the traveling modes over the frequency range 10 kHz -- 100 kHz up to 50 mm in thickness of the vessel wall. Leaky Lamb wave (L_1) and (SH) mode have been proposed theoretically on the

some assumption to be most available to detect the boiling sound of sodium propagating along the vessel wall.

53948 **(PNC-N—941-81-116) Simulation study of neutronic and acoustic methods of boiling detection.** Shimazaki, J.; Fujii, Y.; Shinohara, Y.; Araki, H. (Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan)). 1981. 10p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703057.

As a part of the work on the development of a diagnostic system for detecting anomalies in the core of a fast breeder reactor, a study is being made on the methods of detecting abnormal reactivity and coolant boiling on the basis computer simulation. The objective of the present simulation study is to obtain some basic information useful for developing sensitive method of signal processing suitable for boiling detection. Neutronic, acoustic and measurement noises as well as reactor kinetics and reactivity estimator are simulated on a hybrid computer and analyzed for various noise conditions using correlation, spectral and coherence analyses. It has been confirmed that the cross-spectral and coherence analyses between neutronic and acoustic signals are effective method for boiling detection provided that the void coefficient of reactivity is sufficiently large and that detection capability is slightly improved by using a discriminator of signal level before making spectral analysis. A simulated boiling detection experiment using a zero power thermal reactor is also planned in order to check the validity of computer simulation.

53949 **The beginning of ASTM standards for nuclear instrumentation.** McCue, D.D. (Instrumentation and Controls Division of the Oak Ridge National Laboratory in Oak Ridge, TN). *American Society for Testing and Materials, Special Technical Publication;* **11**: No. 3, 27-29(Mar 1983).

Discusses plans of C26.10 to produce basic, complete standards that will stand as a reliable reference for those in the nuclear fuel cycle industries responsible for the evaluation, specification, calibration, application, installation, and maintenance of the subject equipment. Reports that the subcommittee is working on a standard for differential pressure transmitters that will describe test methods that will reveal the effect on performance due to various installation practices and environmental conditions encountered during normal operation. Points out that the nuclear fuel industry frequently requests new standards from the society to fulfill current technical needs.

53950 **Magnetic switch for reactor control rod.** Germer, J.H. US Patent Application 6-429,922. 30 Sep 1982. 19p. Contract AT03-76SF71032.

A magnetic reed switch assembly is described for activating an electromagnetic grapple utilized to hold a control rod in position above a reactor core. In normal operation the magnetic field of a permanent magnet is short-circuited by a magnetic shunt, diverting the magnetic field away from the reed switch. The magnetic shunt is made of a material having a Curie-point at the desired release temperature. Above that temperature the material loses its ferromagnetic properties, and the magnetic path is diverted to the reed switch which closes and short-circuits the control circuit for the control rod electro-magnetic grapple which allows the control rod to drop into the reactor core for controlling the reactivity of the core.

53951 **(CEA-tr—2-687-5) Acoustic control system BN-350. Explanatory note.** (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). Feb 1982. Translation of BN—350 (SSSR). 56p. (In French). CEN Saclay, Service de Documentation, 91191 - Gif-sur-Yvette Cedex (France).

A description of the acoustic system developed to control boiling in the active zone of the BN 350 reactor is given together with the corresponding technical characteristics. The results of experiments and calculations which confirm the validity of the solutions adopted are discussed. Theoretical calculations on the boiling process in the duct are reported together with details on the fast diagnostic system. A means for localizing the onset of boiling is also given, possible error being taken into consideration. The special features of the passive acoustic diagnostic method used to study boiling are described and schemas of the anciliary equipment presented.

2205 Environmental Aspects

53952 **(NUREG/CR—2850-Vol.2) Population dose commitments due to radioactive releases from nuclear power plant sites in 1980.** Baker, D.A.; Peloquin, R.A. (Pacific Northwest Lab., Richland, WA (USA)). Aug 1983. Contract AC06-76RL01830. 124p. (PNL—4221-Vol.2). NTIS, PC A06/MF A01 - GPO $5.50. Order Number DE83017609.

Population radiation dose commitments have been estimated from reported radionuclide releases from commercial power reactors operating during 1980. In addition doses derived from the shutdown reactors at the Three Mile Island site were included. Fifty-year dose commitments from a one-year exposure were calculated from both liquid and atmospheric releases for four population groups (infant, child, teen-ager and adult) residing between 2 and 80 km from each site. This report tabulates the results of these calculations, showing the dose commitments for both liquid and airborne pathways for each age group and organ. Also included for each site is a histogram showing the fraction of the total population within 2 to 80 km around each site receiving various average dose commitments from the airborne pathways. The total dose commitment from both liquid and airborne pathways ranged from a high of 40 person-rem to a low of 0.02 person-rem with an arithmetic mean of 4 person-rem. The total population dose for all sites was estimated at 180 person-rem for the 96 million people considered at risk.

53953 **Measurement of in situ dynamic properties in relation to geologic conditions.** Dobecki, T.L. (Sandia Lab., Albuquerque, NM). *Reviews in Engineering Geology;* **4**: 201-214(1979).

Evaluation of nuclear power plant sites from a material stability standpoint requires measurement of in situ dynamic properties. These are derived from measurement of shear-wave propagation velocity in subsurface materials by utilizing either the seismic downhole or seismic cross-hole techniques, or both. The downhole technique is rapid and less expensive than the cross-hole survey but is limited in maximum survey depth and resolution of thin, higher velocity beds. The cross-hole test, although less subject to depth and resolution limitations, requires more boreholes and is therefore more expensive. This test is also more exacting because of borehole drift considerations and timing corrections that may or may not be required for the particular energy source used. Actual field cross-hole examples for several sites of varied subsurface geology illustrate the variation of shear velocity versus material make-up and condition.

2206 Research, Test, And Experimental Reactors

REFER ALSO TO CITATION(S) 53493, 53936, 53940, 53941, 53943, 53990, 53991, 53995, 53996, 54002, 54009, 54017

53954 **(AD-A—129887/6) Safety analysis of modifications to upgrade the reactor ventilation system at Armed Forces Radiobiology Research Institute. Technical report.** Moore, M.L. (Armed Forces Radiobiology Research Inst., Bethesda, MD (USA)). Mar 1983. 43p. NTIS, PC A03/MF A01.

This report describes the proposed changes to the ventilation system of the reactor building at the Armed Forces Radiobiology Research Institute (AFRRI) in Bethesda, Maryland. Classified as a Safety Analysis Report that meets the requirements of the Code of Federal Regulations (Title 10, Part 50.59), this document provides the basis for the author's conclusion that the changes to the system involve no unreviewed safety questions and, in fact, improvements in the radiological safety at AFRRI. In order to accomplish these changes, certain other changes must be made to AFRRI administrative documents. Included here are excerpts from the administrative documents and the changes to be made to them. Minutes of a meeting of the Reactor and Radiation Facility Safety Committee (of AFRRI) confirm the fact that the Committee has reviewed this report and has concurred with it.

53955 **(CONF-801144—5) Performance and fuel-cycle cost comparisons with HEU and LEU fuels.** Matos, J.E.; Daly, T.A. (Argonne National Lab., IL (USA)). 1980. Contract W-31-109-ENG-38. 14p. NTIS, PC A02/MF A01. Order Number DE83017967.

From International meeting on development, fabrication, and application of reduced-enrichment fuels for research and test reactors; Argonne, IL, USA (13 Nov 1980).

Portions are illegible in microfiche products.

The objective of this study is a consistent analysis of the performance and fuel cycle costs with HEU (93%) fuel and the various LEU (<20%) fuels that are under development, undergoing irradiation testing of small samples, or in the demonstration phase. All calculations were performed using the generic 10 MW reactor that has been studied extensively by a number of laboratories in the IAEA Guidebook. The conclusion of this study is that there are excellent opportunities for reducing fuel cycle costs in conversions from HEU to LEU if the LEU fuels that are being developed and tested are successful and if all safety considerations allow. The cost reductions described here are the direct result of the longer cycle lengths that can be obtained with increased ^{235}U loadings. Each reactor is an individual case and fuel cycle economics should, along with safety considerations, be an integral part of choosing the optimal fuel and fuel element design for conversion to LEU.

53956 **(CONF-801144—6) Status of RERTR fuel demonstrations.** Snelgrove, J.L. (Argonne National Lab., IL (USA)). 1980. Contract W-31-109-ENG-38. 13p. NTIS, PC A02/MF A01. Order Number DE83017971.

From International meeting on development, fabrication, and application of reduced-enrichment fuels for research and test reactors; Argonne, IL, USA (13 Nov 1980).

The fuel demonstration activity of the US RERTR Program is moving ahead on several fronts with the active participation by European fuel fabricators and reactor operators. A number of fuel elements are currently being fabricated or will soon be fabricated for irradiation in several reactors in the US and Europe. A whole-core demonstration of the physics properties of LEU fuel is scheduled to begin in about half a year. The data from the irradiations and the whole-core demonstration are expected to show, by early 1983, that the near-term intermediate-density LEU fuels can indeed be used reliably and safely. A full demonstration of fuel-cycle economics must await, however, results of a second whole-core demonstration or the establishment of an equilibrium fuel cycle in the FNR. In either case several more years will have passed before such data is available.

53957 **(CONF-801144—7) Burnup-dependent cross-section data for research reactors.** Woodruff, W.L. (Argonne National Lab., IL (USA)). 1980. Contract W-31-109-ENG-38. 12p. NTIS, PC A02/MF A01. Order Number DE83016923.

From International meeting on development, fabrication, and application of reduced-enrichment fuels for research and test reactors; Argonne, IL, USA (13 Nov 1980).

Studies currently in progress consider research and test reactors which commonly have burnups of 50 atom percent in ^{235}U and may reach as high as ~ 70 atom percent. At these levels of burnup changes in cross-section data with burnup become significant. Some preliminary studies of these effects lead to the development of a modified version of REBUS-2 which supports changes in cross-section data with burnup. This version of REBUS-2 allows for changes in the cross-section data only at each time sub-interval in the problem, and these cross-section changes for capture and fission are based on a least squares polynomial fit as a function of burnup. In this paper an attempt is made to evaluate the importance of burnup dependent data for the various isotopes and/or groups, and to assess the accuracy of this method by comparing the REBUS-2 results with results obtained from PDQ-7.

53958 **(CONF-801144—8) Analytical study of using cadmium burnable absorbers in LEU fuel elements.** Deen, J.R.; Snelgrove, J.L. (Argonne National Lab., IL (USA)). 1980. Contract W-31-109-ENG-38. 32p. NTIS, PC A03/MF A01. Order Number DE83017286.

From International meeting on development, fabrication, and application of reduced-enrichment fuels for research and test reactors; Argonne, IL, USA (13 Nov 1980).

Portions are illegible in microfiche products.

In order to realize any of these potential fuel cycle cost savings from the fabrication of fewer, heavier loaded elements, the characteristics of the potential suitable burnable absorbers must be well understood. Boron and cadmium are the two leading candidates at this time. These two absorbers will be compared in the first half of the paper and then more emphasis will be placed on cadmium in the latter half. The ultimate goal of this work is to examine the feasibility of using standard fuel plates to assemble unique fuel elements for a variety of reactors through the use of appropriate Cd wire poison in each element. If U_3Si fuels become available in the near future, significant fabrication cost savings might be realized by reduction in the number of elements required to operate the reactor and by standardization of the elements fabricated.

53959 **(CONF-801144—9) Current status of the RERTR Program.** Travelli, A. (Argonne National Lab., IL (USA)). 1980. Contract W-31-109-ENG-38. 12p. NTIS, PC A02/MF A01. Order Number DE83017214.

From International meeting on development, fabrication, and application of reduced-enrichment fuels for research and test reactors; Argonne, IL, USA (13 Nov 1980).

The main purpose of this paper is to review the progress which has been accomplished by the RERTR Program during the past year, the present status of the program, the activities which are now in progress, and the program plans for the coming years. The changes that have taken place in the overall program plan are, in themselves, not very significant. Some activities were found to be somewhat more difficult than expected and required a longer time to complete; others were found to be less difficult than expected and caused opposite readjustments of the program plan. These effects tend to balance each other when the program is considered as a whole.

53960 **(CONF-801144—10) Reduced-enrichment fuel alternatives for the JAERI reactors.** Komoriya, H.; Matos, J.E. (Argonne National Lab., IL (USA)). 1980. Contract W-31-109-ENG-38. 21p. NTIS, PC A02/MF A01. Order Number DE83017254.

From International meeting on development, fabrication, and application of reduced-enrichment fuels for research and test reactors; Argonne, IL, USA (13 Nov 1980).

This paper summarizes the results to date of a joint program between the Argonne National Laboratory (ANL) and the Japan Atomic Energy Research Institute (JAERI) to study the options available for using medium- and low-enriched uranium in three JAERI reactors (JMTR, JRR-2, and JRR-4).

53961 **(CONF-801144—11) Neutronics and thermal-hydraulics analysis of KUHFR.** Woodruff, W.L.; Mishima, K. (Argonne National Lab., IL (USA); Kyoto Univ., Kumatori, Osaka (Japan). Research Reactor Inst.). 1980. Contract W-31-109-ENG-38. 36p. NTIS, PC A03/MF A01. Order Number DE83017970.

From International meeting on development, fabrication, and application of reduced-enrichment fuels for research and test reactors; Argonne, IL, USA (13 Nov 1980).

Portions are illegible in microfiche products.

Detailed calculations have been completed for the KUHFR with MEU (45%) fuel. These results reflect the direct substitution of 45% enrichment UAl/sub x/-Al fuel at a density of 1.6 g/cm^3 uranium for the HEU (93%) fuel in the reference design. No other changes in the dimensions or design of the reactor are required. This study also includes two cases for LEU (<20%) fuel which consider the feasibility of minor design changes in the fuel plates or fuel elements. The first LEU case has the clad thickness reduced from 0.045 cm to 0.038 cm with a corresponding increase in the fuel meat thickness, and the second case has a single fuel plate removed from both the inner and outer fuel elements to accommodate thicker fuel plates. In both LEU cases the fuel meat is U_3O_8-Al at 3.0 g/cm^3 uranium.

53962 **(CONF-821155—11) RERTR program progress in qualifying reduced-enrichment fuels.** Snelgrove, J.L. (Argonne National Lab., IL (USA)). 1982. Contract W-31-109-ENG-38. 17p. NTIS, PC A02/MF A01. Order Number DE83017139.

From International meeting on research and test reactor core conversions from HEU to LEU fuels; Argonne, IL, USA (8 Nov 1982).

In order to provide the technical means for reducing the enrichment of uranium used to fuel research and test reactors, the US Reduced Enrichment Research and Test Reactor (RERTR) Program has been engaged in the development and testing of higher-uranium-density fuels than had been used previously. The main characteristics to be considered in evaluating the performance of a fuel are its swelling, its blister-threshold temperature, and its metallurgical appearance. Data for the qualification of the reduced-enrichment fuels being developed by the RERTR Program are obtained from examination of minature fuel plates (miniplates) which successfully pass the irradiation screening tests and from examinations of full-sized fuel elements. This paper will summarize the miniplate data and will give the status of full-sized element irradiations. Finally, the current status of qualification of the various fuel types will be discussed and some projections of the future will be given.

53963 **(CONF-821155—12) Current status of the US RERTR Program.** Travelli, A. (Argonne National Lab., IL (USA)). 1982. Contract W-31-109-ENG-38. 8p. NTIS, PC A02/MF A01. Order Number DE83017382.

From International meeting on research and test reactor core conversions from HEU to LEU fuels; Argonne, IL, USA (8 Nov 1982).

This paper describes the status of the RERTR Program. The main objective is to provide the audience with some orientation and sense of perspective that may assist in viewing the other program presentations as part of an overall effort, rather than as separate and unrelated activities.

53964 **(CONF-821155—13) Analysis of the KUCA MEU experiments using the ANL code system.** Shiroya, S.; Hayashi, M.; Kanda, K.; Shibata, T.; Woodruff, W.L.; Matos, J.E. (Argonne National Lab., IL (USA); Kyoto Univ., Kumatori, Osaka (Japan). Research Reactor Inst.). 1982. Contract W-31-109-ENG-38. 13p. NTIS, PC A02/MF A01. Order Number DE83017969.

From International meeting on research and test reactor core conversions from HEU to LEU fuels; Argonne, IL, USA (8 Nov 1982).

Portions are illegible in microfiche products.

This paper provides some preliminary results on the analysis of the KUCA critical experiments using the ANL code system. Since this system was employed in the earlier neutronics calculations for the KUHFR, it is important to assess its capabilities for the KUHFR. The KUHFR has a unique core configuration which is difficult to model precisely with current diffusion theory codes. This paper also provides some results from a finite-element diffusion code (2D-FEM-KUR), which was developed in a cooperative research program between KURRI and JAERI. This code provides the capability for mockup of a complex core configuration as the KUHFR. Using the same group constants generated by the EPRI-CELL code, the results of the 2D-FEM-KUR code are compared with the finite difference diffusion code (DIF3D(2D) which is mainly employed in this analysis.

53965 **(ITEF—69(1982)) Calculating the thermal neutron fields in polycells with "black" blocks using the one-velocity p3-approximation and Monte-Carlo method.** Begichev, S.N.; Il'yashenko, A.S.; Raevskaya, V.E.; Torlin, B.Z. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Teoreticheskoj i Ehksperimental'noj Fiziki). 1982. 23p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703038.

The purpose of the study is to prove the possibility of using the P-3 approximation in the spherical harmonics method for calculating the thermal neutron fields in complex cells of nuclear reactor polylattices with channels with almost "black" blocks. Neutron fluxes and nuclear reaction velocities are calculated for the RBMK and MR type reactor cells in one-velocity approximation using the Monte Carlo and spherical harmonics methods as well as the methods of characteristics and first collision probability. The EXAMP, P3F, REKINUR and MK programs are used for calculations. 3 variants, namely the uniform RBMK type lattice with homogenized channels, the double lattice of the MR type with homogenized channels and the double lattice of the MR type with multiring channels, are investigated. The analysis of the obtained results shows that for the uniform RBMK type lattice and double MR type lattice with homogenized channels a satisfactory agreement of calculational results for all above methods is observed. In the case of double the MR type lattice with multiring channels maximum differences in neutron flux values obtained using the P-3 approximation and the Monte Carlo method at given boron absorption cross sections in the reactor control system channel and various lattice pitches constitute respectively 1% for the absorbing section of reactor control system channel, 2% for multiplying zones of the fuel channel, 6% for graphite, 11% for water zones. It is concluded that the calculational error for the P-3 approximation as compared with that for the Monte Carlo method is practically independent of lattice pitch and boron absorption cross section value.

53966 (KURRI-TR—203, pp 53-59) **Theoretical and experimental notes on noise phenomena of KUR.** Kishida, K. (Gifu Univ., Japan). 1980. (In Japanese). NTIS (US Sales Only), PC A06/MF A01. (CONF-800195—).

From Meeting on statistical phenomena in reactors; Kumatori, Japan (21 Jan 1980).

The classification of global or local noise is important in reactor noise analysis. The term of "global" or "local" corresponds to that of "system size" or "cell size" in statistical physics. On the other hand, point model or phase space description is used in time series analysis. If a time series model describing spatial behavior is established, it will serve to reactor diagnosis. The noise phenomena of KUR are discussed from these points of view. In other words, from experimental results, the point reactor picture is reasonable to neutronic aspect but quantitative problem remains in coolant temperature fluctuations. By taking into account a diffusion type model, the spatial dependence is discussed for the problem remaining in coolant temperature fluctuations. It is pointed out that the time-space picture is a crucial idea of reactor noise phenomena.

53967 **(NIIAR—19(534)) Software for the PROFILE subsystem in the radiation material testing research system for mass measurements of irradiated fuel element geometric dimensions.** Basova, B.G.; Ivanov, V.B.; Kanashov, B.A.; Kosorukova, L.A.; Rabinovich, A.D.; Sukhachev, V.A. (Nauchno-Issledovatel'skij Inst. Atomnykh Reaktorov, Dimitrovgrad (USSR)). 1982. 12p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703101.

A software for the PROFILE subsystem aimed at automated acquisition and processing the data on changes in geometrical dimensions of fuel elements irradiated in the BOR-60 reactor is described. The software consists of five programs, namely DAMEJ, PLDAM, VKROP, = PU and GISTO and the PROF subroutine written in the MNEMOCODE language for the M-6000 computer. The programs operate under the real time disk operational system control. Data processing can be realized in the on-line and off-line modes in turn. The described software provides dialogue control for data processing and simplifies its correction.

53968 **(PB—83-218636) NBS reactor: summary of activities July 1981 through June 1982. Technical note. Jul 81-Jun 82.** Shorten, F.J. (National Bureau of Standards, Washington, DC (USA)). Jun 1983. 235p. (NBS-TN—1178). NTIS, PC A11/MF A01.

This report summarizes all those programs which depend on the NBS reactor. It covers the period from July 1981 through June 1982. The programs range from the use of neutron beams to study the structure and dynamics of materials through nucelar physics and neutron standards to sample irradiations for activation analysis, isotope production, radiation effects studies, neutron radiography, and nondestructive evaluation.

53969 **(PNC-G—033-82-01(1)) Operating experiences and present activities of JOYO.** Nakano, M.; Kodaira, K.; Ito, Y.; Inoue, T.; Matsuno, Y. (Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan)). Jan 1982. 25p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703040.

The preliminary design of experimental fast reactor JOYO was started in 1965, and three steps of conceptual designs were carried out, and main parameters were fixed during these steps. This paper describes the operating experiences which contain functional test before criticality, initial criticality and low power testing, power ascension tests to 50 MWt operation, power ascension tests to 75 MWt and 75 MWt operation.

53970 **(PNC-G—033-82-01(2)) Material surveillance program of JOYO.** Kodaira, K.; Hirao, K.; Taniyama, H.; Matsuno, Y. (Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan)). Feb 1982. 6p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703041.

The structural materials of the Experimental Fast Reactor, "JOYO", must maintain sufficient mechanical strength during the entire reactor plant lifetime. In JOYO, the material surveillance for reactor structural components, safety vessel, primary cooling system piping, secondary cooling system piping and tank have been planned to confirm the design integrity of these structures. The material surveillance specimens have been loaded in the reactor plant and they will be periodically taken out and examined during plant life to monitor any changes in mechanical properties. This report summarizes the material surveillance program of JOYO.

53971 **(PNC-G—033-82-01(3)) Operation experiences of JOYO fuel failure detection system.** Tamura, S.; Hikichi, T.; Rindo, H. (Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan)). Jan 1982. 12p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703042.

Monitoring of fuel failure in the experimental fast reactor JOYO is provided by two different methods, which are cover gas monitoring (FFDCGM) by means of a precipitator, and delayed neutron monitoring (FFDDNM) by means of neutron detectors. The interpretation of signals which were obtained during the reactor operation for performance testings, was performed. The countrate of the CGM is approximately 120 cps at 75MW operation, whose sources are due to Ne^{23}, Ar^{41}, and Na^{24}. And the countrate of the DNM is approximately 2300 cps at 75MW operation which is mainly due to leakage neutron from the core. With those background of the systems, alarm level for monitoring was set at several times of each background level. The reactor has been operated for 5 years, the burn-up of the fuel is 40,000 MWD/T at the most. No trace of any fuel failure has been observed. The fact is also proven by the results of cover gas and sodium sampling analysis. In order to evaluate sensitivity of the FFD systems, a preliminary simulation study has been performed. According to the results, a signal level against one pin failure of 0.5 mm^3 hole may exceed the alarm level of the FFDCGM system.

53972 **(PNC-G—033-82-01(4)) Post irradiation examination of JOYO fuel subassemblies.** Miyakawa, S.; Ishiyama, S.; Ohtake, T.; Watanabe, S. (Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan)). Feb 1982. 23p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703043.

JOYO experimental fast reactor has been in operation since April 1977 when the MK-I core attained initial criticality. At the present time, January 1982, eighteen core fuel subassemblies and six blanket fuel subassemblies have been removed from the reactor, and submitted for Post Irradiation Examination (PIE), as part of the surveillance program of the core components. The examinations of fifteen core fuel subassemblies have been completed. The PIE of the remaining core elements is currently being conducted. The maximum average burnup of the core fuel subassemblies submitted for examination was about 32,000 MWD/T, and the maximum peak linear heat rate was about 280 w/cm. The PIE includes visual inspection, dimensional measurements, gamma-scanning, metallography, X-ray radiography, etc. The results of PIE indicate that JOYO fuel subassemblies have maintained their integrity during operation.

53973 **(PNC-G—033-82-01(5)) Thermal and hydraulic experiments of JOYO fuel subassembly.** Miyaguchi, K.; Satoh, K.; Iguchi, T. (Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan)). Jan 1982. 15p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703044.

Cross-flow mixing and pressure loss characteristics over wide Reynolds number range were experimentally investigated and discussed in some detail. These two characteristics are peculiar to pin bundles with spiral spacers and the most important for the thermal hydraulic design of a subassembly with such spacers. From the present studies following conclusions were obtained: 1) The dimensionless mixing rate, k is neary constant for any wire-wrapped pin bundle. 2) The friction factor for a wire-wrapped pin bundle of staggered arrangement has a smooth transition characteristics.

53974 **(PNC-G—033-82-01(6)) Field in situ vibration testing of JOYO heat transport system piping.** Inoue, T.; Taniyama, H. (Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan)). Feb 1982. 22p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703045.

Recently most Japanese nuclear plants have examined the appropriateness and correctness of the piping design by field in-situ vibration testing. This testing has also become a necessary step in the construction of safe and reliable nuclear plants in seismic areas in the world. For the experimental fast reactor, JOYO, the major piping routes of the reactor coolant system have been tested as one of the functional test programs performed after the construction of the plant. The forced vibration testing method using electromagnetic exciters and applying sine beat excitation to the loop of the layout of the piping system was mainly employed. Field vibration testing is one of the beat means to verify design adequacy and to facilitate licensing related to seismic problems. The vibration modes and eigenfrequencies obtained from the test strongly coincide with the analized data. The damping factor varying from 2.5% to 20%, which is higher than the design value (0.5, 1.0%), were measured. From those results the design adequacy and the structural integrity of the pipings have been confirmed at seismic event point of view.

53975 **(PNC-G—033-82-01(7)) Integrated leak rate test results of JOYO reactor containment vessel.** Tamura, M.; Endo, J. (Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan)). Feb 1982. 18p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703046.

Integrated leak rate tests of JOYO after the reactor coolant system had been filled with sodium have been performed two times since 1978 (February 1978 and December 1979). The tests were conducted with the in-containment sodium systems, primary argon cover gas system and air conditioning systems operating. Both the absolute pressure method and the reference chamber method were employed during the test. The results of both tests confirmed the functioning of the containment vessel, and leak rate limits were satisfied. In Addition, the adequancy of the test instrumentation system and the test method was demonstrated. Finally the plant conditions required to maintain reasonable accuracy for the leak rate testing of LMFBR were established. In this paper, the test conditions and the test results are described.

53976 **(PNC-J—260-82-01) Measurements of neutron and gamma ray streaming through a duct, (2), (3).** Hashikura, H.; Fukumoto, H.; Akiyama, M.; Oka, Y.; An, S. (Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan)). Mar 1982. 33p. (In Japanese). (UTNL-R—0121). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83703061.

Measurements were made of neutron and gamma ray streaming through a duct and a cavity in concrete shields in the fast neutron source reactor YAYOI of the University of Tokyo. The neutron spectra measured by a NE213 scintillator and proton recoil counters were compared with the calculations using Monte Carlo code, MORSE-CG. The agreements between the experiments and the calculations were generally satisfactory. The attenuations of neutron and gamma ray in the cavity and the duct were studied in the three experimental configurations.

53977 **(PNC-N—241-81-11(6)) Studies on modeling to failed fuel detection system response in LMFBR.** Miyazawa, T.; Saji, G.; Mitsuzuku, N.; Hikichi, T.; Odo, T.; Rindo, H. (Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan)). May 1981. 21p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703050.

Failed Fuel Detection (FFD) system with Fission Products (FP) detection is considered to be the most promissing method, since FP provides direct information against fuel element failure. For designing FFD system and for evaluating FFD signals, some adequate FFD signal response to fuel failure have been required. But few models are available in nowadays. Thus Power Reactor and Nuclear Fuel Development Corporation (PNC) had developed FFD response model with computer codes, based on several fundamental investigations on FP release and FP behavior, and referred to foreign country experiences on fuel failure. In developing the model, noble gas and halogen FP release and behavior were considered, since FFD system would be composed of both cover gas monitoring and delayed neutron monitoring. The developed model can provide typical fuel failure response and detection limit which depends on various background signals at cover gas monitoring and delayed neutron monitoring. According to the FFD response model, we tried to assume fuel failure response and detection limit at Japan experimental fast reactor "JOYO". The detection limit of JOYO FFD system was estimated by measuring the background signals. Followed on the studies, a complete computer code has been now made with some improvement. On the paper, the details of the model, out line of developed computer code, status of JOYO FFD system, and trial assumption of JOYO FFD response and detection limit.

53978 **(PNC-N—930-80-02) Nuclear reactor technology progress report, Volume 2. July-September 1980.** (Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan)). 1981. 53p. (In Japanese). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83703051.

The works of the Engineering Section, Fast Experimental Reactor Division, are roughly classified into the technologies concerning the reactor core, abnormality monitoring, the plant, purity control and operation planning. In this paper, the activities of the Engineering Section, the operational results of Joyo and the foreign informations on FBRs in this quarter are reported. The irradiation group in the Engineering Section became an independent section on July 1. The third cycle operation of Joyo at 75 MW was carried out from July 14 to September 2, and the required tests were performed. 5 SN reports, 1 N report and 67 memos were drawn up in this quarter. The review of the fundamental processes in the works to translate to the MK-2 core was carried out, and the report was made. The review of the spent fuel storage plan for Joyo was started. The works to establish the long term plan for up to 10 years were forwarded. The meetings within and outside the division are reported. The data obtained in the tests on the characteristics of the core and the plant are shown. As the results concerning the reactor technologies, the development of dosimetry techniques, the measurement and analysis of the core characteristics, the change of the core characteristics in course of time in view of reactor noise analysis, the drift of coolant temperature at the assembly exit, the evaluation of the stability of coolant temperature control system and others are reported.

53979 **(PNC-N—930-80-03) Nuclear reactor technology progress report, Volume 3. October - December, 1980.** (Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan)). 1981. 37p. (In Japanese). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83703052.

The works of the Engineering Section, Fast Experimental Reactor Division, are roughly classified into the technologies concerning the reactor core, abnormality monitoring, the plant, purity control and operation planning. In this paper, the activities of the Engineering Section, the operational results of Joyo and the foreign informations on FBRs in this quarter are reported. The reactor is stopped for the second regular inspection. 5 SN reports, 2 N reports, 1 SG report and 81 memos were drawn up. Joyo flow chart study meetings were held, and the flow chart was made. It was decided to forward the study on the reprocessing of branket fuel without increasing the existing capacity. At present, the burn-up of the core fuel has reached 60% of 42,000 MWd/t, the MK-1 target value, and the preparation of FFD signal interpretation was started for the fourth cycle operation at 75 MW. The study on the test program was started, considering that the MK-1 core will be finished in the fourth to sixth cycle operations in the next year. The various meetings within and outside the division are reported. As for the results concerning the reactor technologies, the development of dosimetry techniques, the measurement and analysis of the core characteristics, the remodeling of Joyo on-line data processing system, the evaluation of the indication of electromagnetic flow meters for secondary cooling system and others are reported.

53980 **(PNC-N—930-80-04) Nuclear reactor technology progress report, Volume 4. January - March, 1981.** (Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan)). 1981. 39p. (In Japanese). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83703053.

The works of the Engineering Section, Fast Experimental Reactor Division, are roughly classified into the technologies concerning the reactor core, abnormality monitoring, the plant, purity control and operation planning. In this paper, the activities of the Engineering Section, the operational results of Joyo and the foreign informations on FBRs in this quarter are reported. The second regular inspection carried out successively from the previous quarter was completed, and the fourth cycle operation of Joyo at 75 MW was started. The measurement of CP around the primary system pipings and equipments, the preliminary test of a core flow meter for Monju, and the various characteristic tests were carried out during this period. 2 N reports, 1 SA report and 63 memos were drawn up in this quarter. The test plan to be carried out during the period of the fourth to sixth cycle operations in this last year using the MK-1 core was formed and decided. Various meetings within and outside the division are reported. The data obtained in the operational characteristic test and special test are shown. As the results concerning the reactor technologies, the development of dosimetry techniques, the measurement and analysis of the core characteristics, the measurement of the temperature and flow velocity of coolant at the fuel assembly exit, the system pressure loss in the primary cooling system and others are reported.

53981 **(PNC-N—930-81-01) JOYO reactor technology progress report, Volume 5. April - June 1981.** (Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan)). Sep 1981. 64p. (In Japanese). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83703054.

This report summarizes the technical progress made by the PNC Experimental Fast Reactor Division in the period April through June 1981. Main contents are as follows. 3.1 Radiation Shielding Performance Test: Radiation rates in and around the containment vessel were measured at up to 75 MW power without radiation shield concrete blocks above the reactor pit. 3.2 Measurement and Analysis of the Reactor Core Characteristics: A power coefficient, a burn up coefficient and a excess reactivity were measured in the fourth and fifth 75 MW duty operation cycles. 3.3 Transient Response Test: Transient response test was conducted in the fourth 75 MW duty operation cycle. 3.4 Operational Data Banking System: Operational data banking system is ready for service. 3.5 Test Plan of Natural Circulation: Natural circulation test is planned to confirm decay heat removal capability by natural circulation. 3.6 Impurity Control and Analysis: Results of the impurity control and analysis are shown on sodium coolant and argon cover gas for the fourth 75 MW duty operation cycle. 3.7 Surveillance Tests. 3.8 Operation Planning. 8. Special Article: A Long-Range Plan of Reactor Technology Section as of 1980.

53982 **(PTB-FMRB—95) Report on the operation of the FMRB reactor and related activities in the year 1981.** Kriks, H.J.; Vorbrugg, W. (Physikalisch-Technische Bundesanstalt, Braunschweig (Germany, F.R.). Forschungs- und Messreaktor). Oct 1982. 41p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83751053.

In 1981 the Forschungs- und Messreaktor Braunschweig (FMRB) had been in action for 2400 hours without any serious disturbance. The released power for this period amounts to 2294 MWh. The experience in the field of reactor operation, in the radi-

ation protection work as well as in the experiments at the beam tubes is reported.

2207 Plutonium And Isotope Production Reactors

REFER ALSO TO CITATION(S) 53941

53983 (HMI-B—388) Workshop on instrumentation of the disassembled BER II. Jauch, W.; Steiner, M. (Hahn-Meitner-Institut fuer Kernforschung Berlin G.m.b.H. (Germany, F.R.)). 1982. 225p. (In German). (CONF-8204133—). NTIS (US Sales Only), PC A10/MF A01. Order Number DE83751055.

From Workshop on instrumentation of the disassembled BER II; Berlin, F.R. Germany (19 Apr 1982).

A workshop on the instrumentation of a disassembled BER II-reactor took place in the Hahn-Meitner-Institute in Berlin on April 19 and 20, 1982. Invited were all groups that are promoted by the associations 'Neutron Scattering for Investigation of Condensed Substance' and 'Neutron Scattering and Complementary Methods in Chemistry and Biology', along with experts for neutron spectrometers. 40 foreign scientists from 22 different institutes had accepted the invitation. The actual questions were treated in 13 presentations and a certain number of posters, with the latter also comprising activation analysis. The present report contains the presentations submitted, the final discussion minutes and a summary from HMI-view.

53984 (UNI—436) Isotopic composition of irradiated Mark IV and Mark IA fuel. McNeece, J.P. (United Nuclear Industries, Inc., Richland, WA (USA)). 29 Sep 1975. Contract AC06-76RL01857. 60p. NTIS MF A01/MF $13.00. Order Number DE83018203.

Microfiche only, copy does not permit paper copy reproduction; Includes 40 sheets of 48x reduction microfiche.

Safety evaluation of fuel cladding failure accidents, preparing an updated safety analysis report for N-Reactor, and safety analysis of fuel handling and storing operations require detailed knowledge of N-Reactor fuel's fission product and fissionable nuclide inventories. This document provides detailed fission product and fissionable nuclide inventories for Mark IV and Mark IA fuel for exposures from 500 MWD/T to 5000 MWD/T at discharge and for cooling times from 1 hour to 10 years. Fission product inventories were calculated with the computer code RIBD. Input physics and engineering parameters for RIBD and fissionable nuclide inventories were calculated with DCODE.

2208 Propulsion Reactors

REFER ALSO TO CITATION(S) 53992, 54018

2209 Reactor Safety

REFER ALSO TO CITATION(S) 53610, 53626, 53867, 53944, 54072, 54429, 55019

53985 (BNL-NUREG—33530) Thermohydraulics in a high-temperature gas-cooled reactor primary loop during early phases of unrestricted core-heatup accidents. Kroeger, P.G.; Colman, J.; Hsu, C.J. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 25p. (CONF-831047—84). NTIS, PC A02/MF A01. Order Number DE83017577.

From American Nuclear Society winter meeting; San Francisco, CA, USA (30 Oct 1983).

Portions are illegible in microfiche products.

In High Temperature Gas Cooled Reactor (HTGR) siting considerations, the Unrestricted Core Heatup Accidents (UCHA) are considered as accidents of highest consequence, corresponding to core meltdown accidents in light water reactors. Initiation of such accidents can be, for instance, due to station blackout, resulting in scram and loss of all main loop forced circulation, with none of the core auxiliary cooling system loops being started. The result is a slow but continuing core heatup, extending over days. During the initial phases of such UCHA scenarios, the primary loop remains pressurized, with the system pressure slowly increasing until the relief valve setpoint is reached. The major objectives of the work described here were to determine times to depressurization as well as approximate loop component temperatures up to depressurization.

53986 (BNL-NUREG—33574) Model for superheated debris-bed quench for severe-accident containment calculations. Ginsberg, T.; Chen, J.C. (Brookhaven National Lab., Upton, NY (USA)). Aug 1983. Contract AC02-76CH00016. 20p. NTIS, PC A02/MF A01. Order Number DE83017586.

Core meltdown accidents are being analyzed to develop an understanding of the risk associated with such postulated accidents and to evaluate the impact of possible mitigating engineering safety equipment. An integral feature of these analyses is the determination of containment building pressurization as a result of loadings imposed by the energy stored in the molten core debris. A major source of containment pressurization would result from the ex-vessel thermal interaction between molten core debris and water available beneath the reactor vessel. It has been suggested that the thermal interaction would occur in two stages: (1) the melt fall period during which the melt mixes with water, breaks up and transfers energy to the coolant, and (2) the debris bed or molten pool quench period during which the core debris rests on the concrete beneath the vessel and is cooled by an overlying pool of water. This paper is directed towards development of models to predict the thermal-hydraulic characteristics of superheated beds of solidified core debris which are cooled by water supplied by an overlying pool of water.

53987 (CEA-CONF—6523) Internal core catcher in Super Phenix. Le Rigoleur, C.; Kayser, G. (CEA Centre d'Etudes Nucleaires de Cadarache, 13 - Saint-Paul-les-Durance (France)). Jul 1982. 6p. (CONF-820789—1). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703039.

From Seminar on post accident debris cooling; Karlsruhe, F.R. Germany (28 Jul 1982).

The fuel retention capabilities of the internal core catcher in SUPER PHENIX are presented for situations of increasing severity. Remaining uncertainties are put forward.

53988 (CONF-821005—) 1982 international decommissioning symposium. Mickelson, S. (ed.). (USDOE Technical Information Center, Oak Ridge, TN). 1982. Contract AC06-76RL01857. 875p. NTIS, PC A99/MF A01. Order Number DE83008702.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Sixty-four papers were presented at the following sessions: policy, regulations, and standards; management of decommissioning wastes; decommissioning experience; decommissioning tooling and techniques; radiological concerns; and planning and engineering.

53989 (CONF-821005—, pp II.44-II.50) **Utility perspective of nuclear facility decommissioning.** Levy, L.H. (Northeast Utilities, Hartford, CT). 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

This paper will provide a utility viewpoint of current federal decommissioning policies and a discussion of the potential impact of proposed policy revisions. It will also discuss some of the decommissioning financial areas, but primarily be concerned with the technical areas of decommissioning.

53990 (CONF-821005—, pp IV.1-IV.18) **Lessons learned in decommissioning the Sodium Reactor Experiment.** Kittinger, W.D.; Ureda, B.F.; Conners, C.C. 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

The Sodium Reactor Experiment was decommissioned, and the objective of permitting the future unrestricted use of the build-

ing and site was attained. It was decommissioned using a variety of decontamination and dismantling techniques. This project involved the tasks of management, planning, engineering, tooling development, procedure development, mockup, contracts, personnel, training, sodium removal, nuclear systems dismantlement, remote cutting and handling, explosive cutting, safety and contamination control, exposure control, decontamination, excavation, sampling and survey, and waste management. To accomplish these tasks require making refinements and innovations in the decommissioning technology. Several lessons from the project will be useful to future decommissioning projects. 3 references, 17 figures, 1 table.

53991 (CONF-821005—, pp IV.19-IV.38) **Decommissioning of Ames Laboratory Research Reactor.** Link, B.W. (UNC Nuclear Industries, Richland, Washington); Voigt, A.F. 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

The Ames Laboratory Research Reactor (ALRR) was constructed between 1961 and 1965 on a 35-acre open site about 1-1/2 miles from the Iowa State University campus and the rest of the Ames Laboratory facilities. Initial criticality was attained in February and full power in July 1965. Full-time operation was initiated in June 1966. Final reactor shutdown occurred on December 31, 1977, with an accumulation of 1.52×10^4 megawatt days. The reactor decommissioning program was initiated at that point, and was essentially completed by October 1, 1981. Total radiation exposure for the decommissioning program was 69.4 man-rem distributed among 92 persons. The total cost of the program was 4.335 million dollars. Although the initial intent was to be able to release the facility for unrestricted use on completion of decommissioning, the widely dispersed presence of low-level fixed radioactivity on reactor room surfaces and in imbedded piping resulted in the application of a monitored use criterion. 3 references, 2 figures, 2 tables.

53992 (CONF-821005—, pp IV.39-IV.51) **Decommissioning of NS OTTO HAHN.** Lettnin, H.K.J. (GKSS-Forschungszentrum GmbH, Geesthacht, Germany); Viecenz, H.J. 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

With NS OTTO HAHN for the first time a nuclear propelled merchant vessel has been regularly decommissioned after more than 10 years of successful operation. Based on the concept of the total decontamination about 1100 ts of contaminated and decontaminated components have been dismantled and removed from board ship. 260 ts of contaminated components packed in 10 ft containers and 400-liter drums and the 480 ts RPV unit are stored at the GKSS site for post investigations. A total mass of about 370 ts has been decontaminated by mechanical and chemical procedures below the required radiological limits. The nuclear status of OTTO HAHN has been removed by the competent licensing authority in June 1982 so that the vessel is now offered for sale for conventionel operations. 8 references, 11 figures.

53993 (CONF-821005—, pp IV.93-IV.105) **Safe containment of the Niederaichbach Nuclear Power Station (KKN).** Gallenberger, H.; Loeschhorn, U. (Kernforschungszentrum Karlsruhe GmbH, Germany). 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

The 100 MWe Niederaichbach Nuclear Power Station (KKN), located in the Federal Republic of Germany and equipped with a CO_2-cooled and D_2O-moderated pressurized tube reactor stopped operation for good in late July 1974 when its decommissioning was decided. The considerations made on the individual steps of decommissioning, taking into account the necessary techniques and costs, led to transferring the plant initially into the safe containment condition with simple monitoring, treating it in this way as a model case in the Federal Republic of Germany, to be followed by complete disposal at some later date. At present, KKN is in the authorized condition of safe containment. Planning work on disposal has been nearly terminated and the licensing procedure for disposal under the Atomic Energy Act has been initiated. It is intended to perform complete disposal within the years to come. 3 figures, 1 table.

53994 (CONF-821005—, pp IV.106-IV.122) **Decommissioning of Lucens.** Buclin,, J.P. (S.A. l'Energie de l'Ouest-Suisse, Lausanne, Switzerland). 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

After a short presentation of the LUCENS Experimental Nuclear Station project, a description of the plant and of the severe incident it experienced on January 21, 1969 is given. The procedures, methods and tools utilized for dismantling the reactor and simultaneously investigating the causes and consequences of the accident are described in chronological sequences. A brief review of some problems that might arise at underground nuclear plants follows. As a conclusion, main figures are given for the costs spent, the time used, the doses accumulated and the wastes handled. Some recommendations terminate this report. 4 figures.

53995 (CONF-821005—, pp IV.132-IV.143) **Decommissioning of the Oregon State University AGN-201 Reactor.** Dodd, B.; Johnson, A.G. (Oregon State Univ., Corvallis). 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

A brief description and history of Oregon State University's AGN-201 Reactor is presented. This is followed by an outline of the disassembly procedure and a description of the radiation protection aspects of the complete decommissioning. No major problems were encountered in the disassembly process, no radioactive contamination was found on the reactor components, and the radiation dose rates involved were very low. The only measurable radioactivity was on those items known to contain radioactive materials. 2 figures, 2 tables.

53996 (CONF-821005—, pp IV.158-IV.169) **Dismantling of the R1 reactor, Stockholm.** Kaerker, S. (Studsvik Energiteknik AB, Nykoeping, Sweden); Holmgren, P.M. 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

This report describes the dismantling of Sweden's first nuclear research reactor R1. The R1-reactor, which is located underground in a cavern in central Stockholm, was taken into service during the summer of 1954 and shut down finally in 1970. The actual dismantling work started in Nov 1981 after 3 months of preparatory work. The dismantling work is expected to be finished in May 1983. The total estimated cost for the dismantling work, transportation of waste and short time storage of activated/contaminated waste is 25 MSEK. 7 figures, 2 tables.

53997 (CONF-821005—, pp V.13-V.17) **Overview of decommissioning research and development activities in the European Community.** Huber, B. (Commission of the European Communities, Brussels, Belgium). 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

The European Community's research program on the decommissioning of nuclear power plants is managed by the Commission of the European Communities and carried out by national laboratories and private firms under cost-sharing contracts. Starting in 1980, about fifty research contracts covering a large variety of topics have been let so far. The paper outlines the content, progress and selected results of the seven projects composing the program. These projects concern the following subjects: maintaining disused plants in a safe condition; decontamination for decommissioning purposes; dismantling techniques; treatment of waste materials; large waste containers; estimation of waste arisings; and plant design features facilitating decommissioning. 4 references.

53998 (CONF-821005—, pp V.35-V.45) **Dismantling techniques for reactor components using explosives. Feasibility experiments for dismantling the biological shield and the pressure vessel of power reactors.** Freund, H.U.; Bohm, B.; Schumann, S. (Battelle-Institut e.V., Frankfurt am Main, Germany). 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

Both the prssure vessel and the biological shield represent components which contribute substantially to the radioactive inventory of a decommissioned reactor. Thus in order to minimize radiation exposure of personnel it is desirable to reduce the time for the dismantling operation. Methods that are simple, yield fragments of suitable size and shape to facilitate easy conditioning are characteristics of explosives dismantling techniques. The safety aspects of the explosive technique are described. Examples are given for separation of the activated inner layer of the biological shield, and fracturing the reactor pressure vessel in the embrittled state. 10 figures. (DP)

53999 (CONF-821005—, pp V.46-V.59) **Vigorous decontamination tests of steel samples.** Agostinelli, A. (Ente Nazionale per l'Energia Elettrica, Rome, Italy); Bregani, F.; Pascali, R.; Ronchetti, C. 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

Among operative deCommissioning problems, the chemical decontamination of metallic surfaces of LWR, mainly with the use of high vigorous reagents, is being studied in particular. ENEL research activities, partially financed by the European Community Commission, began at the end of 1980, and are being developed by CRTN, Centro di Ricerca Termica e Nucleare, in close connection with ENEL-DPT and CISE. The main aim is the identification, development, and assessment of vigorous decontamination techniques taking into account the amount and disposal cost of liquid radwaste. The test materials come from the primary loop of the BWR-Garigliano plant. Activity levels, mainly due to ^{60}Co, range from about 0.01 $\mu Ci/cm^2$ for predecontaminated material to some $\mu Ci/cm^2$ for virgin material. Moreover, traces of ^{90}Sr-Y beta pure emitter and alpha emitters are monitored. Research is at first carried out by screening static tests for the optimization of etching static parameters (time, temperature, reagent concentrations). Reagent effectiveness will then be tested in a special experimental loop (DECO), in dynamic conditions simulating in-situ real procedures of decontamination. Hydrofluoric, nitric and hydrochloric acids and mixtures of them have been used for the first tests. Sometimes total oxide removal is possible, and when this takes place, the final contamination levels are in accordance with limits indicated for unrestricted release materials in some countries. 18 references, 13 figures, 5 tables.

54000 (CONF-821005—, pp VI.85-VI.124) **Residual radioactivity assessment in nuclear power plants: concentrations, distribution inventories.** Abel, K.H.; Robertson, D.E.; Thomas, C.W.; Evans, J.C.; Lepel, E.A. 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

A research program is being conducted for the USNRC to provide a data base of residual radionuclide concentrations in commercial nuclear generating stations. The data sampling has been conducted at six sites. The measurement program has been completed for two of the the sites. A topical report has been preapred describing the findings at the first site (Pathfinder). The report detailing the findings at the second site (Humboldt Bay) is in preparation. The findings to date indicate no significant radionuclides have been forgotten which might pose additional problems at the time of decommissioning. They also indicate that each reactor site will have a unique set of circumstances associated with its operating history. As examples, Humboldt Bay had an early history of fuel failures which may lead to tramp fuel and fission products spread more widely than at other sites. At Pathfinder the failed superheater led to deposition of vessel-derived metal pieces into piping creating local hot spots of very high radiation levels. The data in this report and the subsequent topical reports describing each reactor site should provide the USNRC an appropriate data base for residual radionuclide concentrations and distributions in commercial power reactors. Using this data base, proper decommissioning assessments can then be made. 7 references, 6 figures, 8 tables.

54001 (CONF-821005—, pp VI.169-VI.183) **Neutron activation of reactor pressure vessel and biological shield of the decommissioned Gundremmingen Unit A Nuclear Power Station.** Bergemann, L. (Kernkraftwerk Gundremmingen Betriebsgesellschaft mbH, Gundremmingen, Germany); Stang, W.; Auler, I.; Loercher, G. 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

For planning the decommissioning of the nuclear power plant Gundremmingen, Block A, an overall balance of the current activity inventory was determined by measurements as well as by calculations. The results showed satisfactory agreement. In all, 5 x 10^{16} Bq were found for the reactor preasure vessel plus its internals. It is found that only the inner part of the biological shield - specially separated - was activated. 5 references, 6 figures, 2 tables.

54002 (CONF-821005—, pp VII.1-VII.12) **JPDR decommissioning program.** Osanai, M. (Japan Atomic Energy Research Inst., Tokai, Ibaraki). 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

National policy regarding decommissioning of nuclear reactors was established in Japan recently, including basic considerations and technology development. A technology development program to implement this policy has been started in Japan Atomic Energy Research Institute utilizing a 90 MWt power demonstration reactor, JPDR. The program consisted of two phases. Phase I Program is aimed at development of individual techniques that will be required for the dismantlement of a nuclear power plant. In this program, demonstration, adaptation, improvement and/or development of techniques will be conducted in the fields of system engineering, radionuclide inventory estimation, decontamination, disassembly, remote handling, waste management, and radiation control. Phase II Program is complete dismantlement of JPDR, aimed at demonstration of dismantling technology and acquisition of actual experience. It is expected taht these programs will provide useful information to the development of technical guidelines for the decommissioning of nuclear power plants. 5 figures.

54003 (CONF-821005—, pp VII.13-VII.23) **Plans and activities for decommissioning of LWR power plants by the German utilities.** Essmann, J. (Preussiche Elektrizitaets AG, Hannover, Germany); Brosche, D. 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

In the Federal Republic of Germany a presupposition for a license for erection or operation of a nuclear power plant is a detailed demonstration that the plant can be decommissioned in compliance with demands for radiation protection. To fulfill this demand since 1975 the German utilities who plan and operate LWR power plants have been studying extensively the decommissioning situation. The German approach to decommissioning, the regulatory framework and the progress to date are dealt with. To show that the German concept is really practicable the achievements and future plans for the decommissioning of the plants KKN, KRB-A and KWL which are definitely shut down, are described briefly.

54004 (CONF-821005—, pp VII.24-VII.39) **Engineering and planning for the Shippingport Station Decommissioning Project.** Miller, C.E. Jr. (Dept. of Energy, Richland, WA); Eirich, A.J. 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

The Shippingport Station Decommissioning Project is currently in the engineering and planning phase. Decommissioning activities are scheduled to begin in the fall of 1984 and end mid-1988. This paper discusses: the purpose and status of the project; the organizations involved; the overall cost, schedule, and technical approach; the management, preplanning, engineering, and decommissioning techniques associated with the project; and its general relevance to commercial nuclear plant decommissioning. 3 references, 2 figures, 2 tables.

54005 (CONF-821005—, pp VII.40-VII.50) **Decommissioning of the Windscale Advanced Gas-Cooled Reactor.** Lawton, H. (United Kingdom Atomic Energy Authority, Seascale, England). 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

Now that the Windscale Advanced Gas-Cooled Reactor has fulfilled its development role and has been closed down, it is planned to decommission it. While ancillary buildings will be put to new use, the reactor itself and its four heat exchangers will be demolished in a project extending into the early 1990's. A special remotely operated machine will be developed to undertake the demolition. The radioactive waste material (steel, graphite, concrete) will be handled through a special building to be built adjacent to the reactor, where it will be boxed up for disposal into monolithic concrete blocks suitable for sea disposal or land storage. It is hoped to deal with the midly active heat exchangers as integral units. The aim of the project is to develop demolition techniques and expertise which will be of value generally to the nuclear industry. Because of this, special emphasis will be given to data recording and dissemination of results during the course of the project. 10 figures, 2 tables.

54006 (CONF-821005—, pp VII.51-VII.65) **Preparing a decommissioning cost and technology study.** Koch, D.A.; Akins, M.J. (Gilbert Associates, Inc., Reading, PA). 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

Decommissioning planning requires a systematic approach to determine costs, radiation exposure, waste disposal, manpower requirements, dismantling and decontamination procedures, personnel protection, and schedules. The basic document of decommissioning planning is the cost and technology study prepared for the specific site. It is important that this study yield results that are complete and comprehensive. This is accomplished by utilizing a methodology known as the Work Package concept which accounts for all significant cost factors and technical activities. The Work Package Concept divides all labor and materials into specific increments which are basically suitable for all power plants and produces summaries of the major results. This paper describes the major study outputs, the work package format and function, and the type of input criteria which must be collected prior to the commencement of the study. It is concluded that correct formating is essential to the complete and consistent processing of large and varied amounts of data and that details and input criteria are crucial to assure adequate sensitivity and reliable results. 7 tables.

54007 (CONF-821005—, pp VII.66-VII.79) **Evaluation of immediate dismantlement of Candu reactors at the end of service life.** Armstrong, P.J. (Ontario Hydro, Toronto); Macphee, R.C. 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

All industrial facilities have to be taken out of service at the end of their useful lives. In the case of a nuclear reactor, decommissioning applies to the actions involved in taking it out of service and placing and maintaining it in a safe state. It is Ontario Hydro's intent that all identifiable costs of power generation be allocated to the customers that benefit from it. Engineering studies have, therefore, been carried out to estimate the future costs of decommissioning our nuclear stations. 6 references, 7 tables.

54008 (CONF-821005—, pp VII.99-VII.114) **Canadian approach to decommissioning.** Bennett, C.R.; Carney, M. 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

Besides the well known power reactors now operating, or near operation, in Canada, there are, in existence, several research, low power and demonstration reactors. Different concepts of decommissioning are applied to these two categories depending upon their usage. Only decommissioning studies have been carried out on reactors, so far, through some support facilities, e.g. mines have been or are being decommissioned to various levels. The planning and execution of the lay-up exercise which has been done at the 250-MWe demonstration reactor, Gentilly-1, has demonstrated the type of consideration which would be required to take a CANDU reactor to the Stage 1 option. The current low level studies of the decommissioning of the 600-MWe CANDU reactors have partially resolved some of the relevant problems of waste management, particularly waste quantities and characterization. These results are particularly applicable to the design concepts of future waste disposal facilities in Canada. 8 figures, 2 tables.

54009 (CONF-821005—, pp VII.115-VII.128) **Decommissioning reference nuclear research and test reactors.** Konzek, G.J. (Pacific Northwest Lab., Richland, WA). 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

Safety and cost information is developed for the conceptual decommissioning of two representative licensed nuclear research and test (R & T) reactors. Three decommissioning alternatives [DECON (immediate decontamination), SAFSTOR (safe storage followed by deferred decontamination), and ENTOMB (entombment)] are studied to compare the costs (in 1981 dollars), occupational radiation doses, potential radiation dose to the public, and other safety impacts of implementing each of the alternatives. 7 references, 3 tables.

54010 (CONF-821005—, pp VII.129-VII.138) **Utility planning for decommissioning.** Williams, D.H. (Arkansas Power & Light Co., Little Rock). 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

Though the biggest impact on a utility of nuclear power plant decommissioning may occur many years from now, procrastination of efforts to be prepared for that time is unwarranted. Foresight put into action through planning can significantly affect that impact. Financial planning can assure the recovery of decommissioning costs in a manner equitable to customers. Decision-making planning can minimize adverse affects of current decisions on later decommissioning impacts and prepare a utility to be equipped to make later decommissioning decisions. Technological knowledge base planning can support all other planning aspects for decommissioning and prepare a utility for decommissioning decisions. Informed project planning can ward off potentially significant pitfalls during decommissioning and optimize the effectiveness of the actual decommissioning efforts.

54011 (CONF-821005—, pp VII.153-VII.168) **Decommissioning study for the Beznau nuclear power plant (2 x 350 MW): the Swiss approach.** Hess, E.; Veya, R. (Nordostschweizerische Kraftwerke AG, Baden, Switzerland). 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

On request of the Swiss Nuclear Regulatory Authority a comprehensive decommissioning study for the Beznau nuclear power plant was worked out in 1980. The purpose of the study was to demonstrate the feasibility of decommissioning and dismantling and to elaborate sound estimates for the amount and type of nuclear waste, the total collective dose, the cost and dismantling schedule. Two alternatives were studied, one starting the dismantling work two years after the final plant shutdown, the other starting the dismantling activities after a mothballing period of 30 years. The results confirmed, that present technology offers adequate dismantling techniques and that the work can be performed in accordance with the Swiss atomic law and regulations. Furthermore it can be concluded that neither the collective dose nor the cost of decommissioning are such as to jeopardize the over all benefits of commericalnuclear power in Switzerland. The conclusions are confirmed by the Swiss nuclear Regulatory Authority's assessment of the decommissioning study, issued in spring 1982. The study contributed to establish a clear position of the authority and the operators on the so far controversial issue of decommissioning in the nuclear debate. The study also helped to convince the authority that there is no incentive today to advocate one or the other decommissioning alternative. The choice has to be made for each specific case weighing all aspects involved at the time of final shutdown. 5 figures, 4 tables.

54012 (CONF-821005—, pp VII.192-VII.197) **Decommissioning of multiple-reactor stations: facilitation by sequential decommissioning.** Moore, E.B.; Smith, R.I.; Wittenbrock, N.G. (Pacific Northwest Lab., Richland, WA). 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

Reductions in cost and radiation dose can be achieved for decommissionings at multiple reactor stations because of factors not necessarily present at a single reactor station: reactors of similar design, the opportunity for sequential decommissioning, a site dedicated to nuclear power generation, and the option of either interim or permanent low-level radioactive waste storage facilities onsite. The cost and radiation dose reductions occur because comprehensive decommissioning planning need only be done once, because the labor force is stable and need only be trained once, because there is less handling of radioactive wastes, and because central stores, equipment, and facilities may be used. The cost and radiation dose reductions are sensitive to the number and types of reactors on the site, and to the alternatives selected for decommissioning. 3 tables.

54013 (CONF-821005—, pp VII.198-VII.213) **Post-accident cleanup and decommissioning of a reference pressurized water reactor.** Murphy, E.S.; Holter, G.M. (Pacific Northwest Lab., Richland, WA). 1982. NTIS, PC A99/MF A01. Contract AC06-76RL01830.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

This paper summarizes the results of a conceptual study to evaluate the technical requirements, costs, and safety impacts of the cleanup and decommissioning of a large pressurized water reactor (PWR) involved in an accident. The costs and occupational doses for post-accident cleanup and decommissioning are estimated to be substantially higher than those for decommissioning following the orderly shutdown of a reactor. A major factor in these cost and occupational dose increases is the high radiation environment that exists in the containment building following an accident which restricts worker access and increases the difficulty of performing certain tasks. Other factors which influence accident cleanup and decommissioning costs are requirements for the design and construction of special tools and equipment, increased requirements for regulatory approvals, and special waste management needs. Radiation doses to the public from routine accident cleanup and decommissioning operations are estimated to be below permissible radiation dose levels in unrestricted areas and within the range of annual doses from normal background. 6 references, 1 figure, 7 tables.

54014 (CONF-821005—, pp VII.227-VII.235) **Decontamination research in the Commission of European Communities' programme on decommissioning of nuclear power plants.** Schaller, K.H. (Commission of the European Communities, Brussels, Belgium). 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

An important part of the European Commissions' indirect research program (1979-1983) on Decommissioning of Nuclear Power Plants is concerned with research and development of procedures and methods in the field of decontamination for decommissioning purposes. Research work in progress, with Commission funding up to 50%, is performed actually by eight organizations on research subjects chosen from an important number of proposals. As a preparation for the initial invitations to submit research proposals, information on decontamination work done in the various types of reactors in operation in the Community had been gathered, and a careful analysis of information allowed to define areas, where further research was needed. A description of the main results of this analysis is given. Based on this work the following five subjects were specified in the call for proposals: estimation of contamination, decontamination of systems, vigorous decontamination of metallic objects, decontamination of building surfaces, and overall studies in order to assess the reasonable decontamination effort in decommissioning. 13 references, 5 tables.

54015 (CONF-821005—, pp VII.236-VII.245) **Costs of decommissioning nuclear power plants as reported to the public to date.** Strasma, J.D. (Univ. of Wisconsin, Madison). 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

This paper attempts to determine what information has been available to the public, in the United States, concerning the cost of decommissioning nuclear power plants. The search was conducted in the Television News Index & Abstracts, in the annual indexes to The Reader's Digest, and in two computer-based bibliographic retrieval systems, Lockheed's DIALOG Magazine Index and the New York Times Information Bank. Fewer than ten articles appeared in widely read places, with none at all in the Reader's Digest and none on the evening TV news, from 1974 to date. The cost of decommissioning nuclear power plants was reported in various ways, with a wide range of estimates and relatively little actual experience. Costs were given in dollars of different years, in percentages of construction costs, in cost per KWH as per month to the consumer, etc., making the range of reported costs seem even wider than it really was. It is not surprising that the public fears that decommissioning costs will be alarmingly high. The public debate on energy policy might be more rational with better information on decommissioning costs. 16 references.

54016 (CONF-821005—, pp VII.246-VII.258) **Decommissioning of Unit A of the nuclear power plant Gundremmingen and its conversion to a condition of protective storage.** Watzel, G.V.P. (Rheinisch-Westfaelisches Elektrizitaetswerk A.G., Essen, Germany); Stang, G. 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

The first German nuclear demonstration power plant, KRB-I in Gundremmingen, with a boiling water reactor and an electric capacity of 250 MW has completed 11 years of very successful commercial operation. In 1980 the decision to decommission the plant was taken and the necessary planning work initiated. The present concept provides to transfer the reactor and auxiliary building into a protective storage and independently of this to further use the turbine building for other purposes, as e.g. for storing low-active waste. For this purpose in order to save space the plant components contained in the turbine building should be dismantled and to a large extent free-decontaminated. The present state of the activities are dealt with. 5 references, 3 figures.

54017 **(CONF-821155—9) PARET code and the analysis of the SPERT I transients.** Woodruff, W.L. (Argonne National Lab., IL (USA)). 1982. Contract W-31-109-ENG-38. 21p. NTIS, PC A02/MF A01. Order Number DE83017968.

From International meeting on research and test reactor core conversions from HEU to LEU fuels; Argonne, IL, USA (8 Nov 1982).

The PARET code has been adapted for the testing of methods and models and for subsequent use in the analysis of transient behavior in research reactors. Comparisons with the experimental results from the SPERT-I transients are provided. The code has also been applied to the analysis of the IAEA 10 MW benchmark cores for protected and unprotected transients. The present version of the PARET code provides a convenient means of assessing the various models and correlations proposed for use in the analysis of research reactor behavior. For comparison with experiments the SPERT-I cores B-24/32, B-12/64, and D-12/25 were chosen. The results of this comparison of the PARET code with the SPERT I cores are generally quite favorable. The agreement with the B-24/32 core is particularly good. This core might be considered a more representative core for research reactors than either the B-12/64 or D-12/25 cores.

54018 (CONF-830528—Summ., pp XXIV.3-XXIV.4) **Packaging, transportation and disposal of nuclear parts from decommissioning of N.S. OTTO HAHN.** Viecenz, H.J. (Gg. NOELL GmbH, Wuerzburg, Germany); Obst, J.; Krieger, F.; Lettnin, H.K.J. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54019 **(CONF-830816—35) Hydrogen-generating reactions in LWR severe accidents.** Baker, L. Jr. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 9p. NTIS, PC A02/MF A01. Order Number DE83017961.

From International meeting on light-water reactor severe accident evaluation; Cambridge, MA, USA (28 Aug 1983).

The available data on the reactions of Zircaloys, stainless steels, uranium metal and uranium dioxide with steam at temperatures above about 1000°C and the reactions of core melts during concrete penetration have been reviewed and assessed for the IDCOR Program. The uranium metal is included because small quantities can be formed from the high temperature interaction between Zircaloy and uranium dioxide and because the uranium data adds insight into the nature of the reactions of core materials with steam. Thermodynamic analyses and comparisons of reaction rate data have been made. One of the purposes of this assessment was to develop fully the information generated in the early studies of oxidation processes, particularly the extensive program carried out at ANL from about 1960 to 1968.

54020 **(CONF-831047—86) Fabrication of UO_2-stainless steel fuel for a fast-reactor safety test.** Rhude, H.V.; O'Keefe, G.B.; Noland, R.A. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 6p. NTIS, PC A02/MF A01. Order Number DE83017941.

From American Nuclear Society winter meeting; San Francisco, CA, USA (30 Oct 1983).

As part of its fast breeder reactor (LMFBR) safety research program, Argonne National Laboratory is conducting a series of tests in the TREAT Reactor to clarify the boilup and freezing behavior of UO_2 fuel and stainless steel in the transition phase of an accident sequence. Although much work has been done on UO_2 dispersed in a stainless steel matrix, no references could be found on work relating to the dispersal of stainless steel in a UO_2 matrix. Consequently a development program was started to produce the necessary fuel. The major difficulty encountered is attributable to the melting range of 316 stainless steel (1391 to 1399°C) which is well below the normal sintering temperature of UO_2 (1750°C). Attempts to produce the required fuel pellets by standard sintering techniques did not work. Alternative approaches to sintering were investigated to determine the density achievable without sintering.

54021 **(DOE/NBM—3012066) Accident at Three Mile Island and its aftermath.** Malinauskas, A.P. (Oak Ridge National Lab., TN (USA)). 18 Apr 1983. Contract W-7405-ENG-26. 35p. NTIS, PC A03/MF A01. Order Number DE83012066.

Portions are illegible in microfiche products.

Viewgraphs are presented that describe the Three Mile Island-2 reactor; the severe accident in the reactor; activity levels following the accident; and estimated costs associated with the accident.

54022 **(DOE/NBM—3017872) Functional requirements for an Exercise Evaluation and Simulation Facility.** (Argonne National Lab., IL (USA)). Apr 1983. Contract W-31-109-ENG-38. 26p. NTIS, PC A03/MF A01. Order Number DE83017872.

The Exercise Evaluation and Simulation Facility (EESF) is a computer-based resource that will improve FEMA's capabilities for evaluating radiological emergency plans and preparedness around commercial nuclear sites. The EESF is being designed from the perspective of the organizations involved (i.e., FEMA Regional and National, and state and local response teams) and takes into account the evolution of radiological and other emergency preparedness activities. Like radiological emergency planning, EESF will evolve to suit FEMA (National and Regional) needs and interests and will be increasingly useful as a resource for radiological emergency planning and evaluation. Table ES-1 briefly describes seven functions for which EESF is currently being designed. They are listed in the approximate order in which they will be designed, developed, and implemented. The only exception is the data base function, which will be developed parallel with the other six functions and enhanced to support these functions, as well as be a source of information on sites, plans, exercises, and evaluations.

54023 **(GKSS—83/E/8) Studies on fluid impurities due to accidents in the containment of PWR reactors.** Kreubig, M. (GKSS-Forschungszentrum Geesthacht G.m.b.H., Geesthacht-Tesperhude (Germany, F.R.)). 1983. 38p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83751056.

In an experimental research program about hydrodynamics of residual heat removal pumps in pressurized water reactors additionally the influence of fluid impurities on the pump performance shall be analysed. "Impurity" means the assembly of solid materials and its concentration in the containment sump following a loss of coolant accident which could influence the operation of the pumps. For critical examination of the parameter "impurity" results of theoretical studies and experiments in large scale test facilities as well as evaluation of damage discriptions of accidents in nuclear power plants are compiled.

54024 **(GRS-F—121) List of reports concerning reactor safety research from BMFT, CEA, EPRI, JSTA, and USNRC.** (Gesellschaft fuer Reaktorsicherheit m.b.H. (GRS), Garching (Germany, F.R.)). Dec 1982. 43p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83751048.

This list reviews reports from the Federal Republic of Germany, from France, from Japan and from the United States of America concerning special problems in the field of Reactor Safety Research. According to the cooperation of the Bundesminister fuer Forschung und Technologie (BMFT) with the Commissariat a l'Energie Atomique (CEA), the Japan Science and Technologie Agency (JSTA), the Electric Power Research Institute (EPRI) and the United States Nuclear Regulatory Commission, these Reports are available in the Gesellschaft fuer Reaktorsicherheit (GRS). The list pursues the following order: Country of origin, problem area concerned, according to the Reactor Safety Research Programm of the BMFT, reporting organization. The list of reports appears quarterly.

54025 **(NUREG—0420-Suppl.4) Safety-evaluation report related to the operation of Shoreham Nuclear Power Station, Unit No. 1 (Docket No. 50-322) .** (Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Reactor Regulation). Sep 1983. 69p. NTIS, PC A04/MF A01. Order Number DE84900071.

Supplement 4 (SSER 4) to the Safety Evaluation Report on Long Island Lighting Company's application for a license to operate the Shoreham Nuclear Power Station, Unit 1, located in Suffolk County, New York, has been prepared by the Office of Nuclear Reactor Regulation of the US Nuclear Regulatory Commission. This supplement addresses several items that have been reviewed by the staff since the previous supplement was issued.

54026 **(NUREG—0827-FINAL) Integrated plant safety assessment. Systematic Evaluation Program. La Crosse Boiling Water Reactor. Dairyland Power Cooperative, Docket No. 50-409. Final report.** (Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Reactor Regulation). Jun 1983. 539p. NTIS, PC A23/MF A01 - GPO $10.00. Order Number DE83902899.

Portions are illegible in microfiche products.

The Systematic Evaluation Program was initiated in February 1977 by the US Nuclear Regulatory Commission to review the designs of older operating nuclear reactor plants to confirm and document their safety. The review provides (1) an assessment of how these plants compare with current licensing safety requirements relating to selected issues, (2) a basis for deciding on how these differences should be resolved in an integrated plant review, and (3) a documented evaluation of plant safety. This report documents the review of the La Crosse Boiling Water Reactor, operated by Dairyland Power Cooperative. The La Crosse plant is one of 10 plants reviewed under Phase II of this program. This report indicates how 137 topics selected for review under Phase I of the pro-

gram were addressed. Equipment and procedural changes have been identified as a result of the review.

54027 **(NUREG/CR—2238-Vol.20) Advanced reactor safety research. Quarterly report, October-December 1981. Volume 20.** (Sandia National Labs., Albuquerque, NM (USA)). Aug 1983. Contract AC04-76DP00789. 303p. (SAND—81-1529-20). NTIS, PC A14/MF A01 - GPO. Order Number DE83018255.

Information is presented concerning the inherent retention of core debris following a severe reactor accident; containment analysis for LWR and LMFBR type reactors; LMFBR accident delineation; advanced reactor core phenomenology; LWR damaged fuel phenomenology; and ACRR status.

54028 **(NUREG/CR—2631) Logical framework for identifying equipment important to safety in nuclear power plants.** Gallup, D.R.; Vannoni, M.G. (Sandia National Labs., Albuquerque, NM (USA)). Jul 1983. Contract AC04-76DP00789. 35p. (SAND—82-2726). NTIS, PC A03/MF A01 - GPO. Order Number DE84000053.

This report presents a logical and comprehensive approach to the identification of all plant functions that contribute to the protection of public health and safety from exposure to radiation released by nuclear power plants. The work is the first task of a proposed three-task program to assist the NRC in developing future regulatory guidance and rulemaking for the quality-assurance programs of nuclear plants. The primary result of this task is the development of a logical structure for the identification and ranking of nuclear-power-plant equipment according to its importance to safety. The overall measure of importance used in this structure is the risk of the plant endangering public health and safety. In parallel with the logical structuring of the problem, general methodological approaches for ranking equipment important to safety are outlined.

54029 **(NUREG/CR—3179) Effect of small-capacity, high-pressure injection systems on TQUV sequences at Browns Ferry Unit One.** Harrington, R.M.; Ott, L.J. (Oak Ridge National Lab., TN (USA)). Sep 1983. Contract W-7405-ENG-26. 117p. (ORNL/TM—8635). NTIS, PC A06/MF A01 - GPO. Order Number DE83017794.

Portions are illegible in microfiche products.

The TQUV [Transient-induced scram, Power Conversion System Unavailable, High Pressure (HPCI, RCIC) and Low Pressure (RHR, Core Spray) injection systems unavailable] accident sequence has been shown to be among the dominant accident sequences in almost all BWR Probabilistic Risk Assessments (PRAs). This report provides an analysis of the ability of the Control Rod Drive (CRD) hydraulic system and the Standby Liquid Control (SLC) system, utilized singly or in combination, to adequately cool the reactor core during this accident sequence. The class of shutdowns considered consists of those initiated by a transient or a loss of off-site power in which there is a successful reactor scram and there is no pipe break. Various combinations of flow delivery capability and operator action are considered and an optimum procedure is recommended. A special version of the MARCH computer code is used to calculate core temperatures and estimate fuel damage for cases involving partial or full core uncovery. The results show that fuel damage can be avoided by appropriate operator action.

54030 **(NUREG/CR—3234) Potential for containment leak paths through electrical penetration assemblies under severe accident conditions.** Sebrell, W. (Sandia National Labs., Albuquerque, NM (USA)). Jul 1983. Contract AC04-76DP00789. 52p. (SAND—83-0538). NTIS, PC A04/MF A01 - GPO. Order Number DE83017028.

Portions are illegible in microfiche products.

The leakage behavior of containments beyond design conditions and knowledge of failure modes is required for evaluation of mitigation strategies for severe accidents, risk studies, emergency preparedness planning, and siting. These studies are directed towards assessing the risk and consequences of severe accidents. An accident sequence analysis conducted on a Boiling Water Reactor (BWR), Mark I (MK I), indicated very high temperatures in the dry-well region, which is the location of the majority of electrical penetration assemblies. Because of the high temperatures, it was postulated in the ORNL study that the sealants would fail and all the electrical penetration assemblies would leak before structural failure would occur. Since other containments had similar electrical penetration assemblies, it was concluded that all containments would experience the same type of failure. The results of this study, however, show that this conclusion does not hold for PWRs because in the worst accident sequence, the long time containment gases stabilize to 350°F. BWRs, on the other hand, do experience high dry-well temperatures and have a higher potential for leakage.

54031 **(NUREG/CR—3269) NaOH-rich corner of the (Na^+, Ca^{2+}) (OH^-, CO_3^{2-}) reciprocal system.** Sallach, R.A. (Sandia National Labs., Albuquerque, NM (USA)). Aug 1983. Contract AC04-76DP00789. 39p. (SAND—82-1980). NTIS, PC A03/MF A01 - GPO. Order Number DE83018244.

The sodium-rich portion of the binary system $(NaOH)_2$ - $Ca(OH)_2$ and the reciprocal system (Na^+, Ca^{2+}) (OH^-, CO_3^{2-}) are described. The $(NaOH)_2$ - $Ca(OH)_2$ system has a peritectic decomposition at 330 +- 5°C and a mole fraction $Ca(OH)_2$ of 0.0055 +- 0.0020. A compound with the apparent stoichiometry $Na_6Ca(OH)_8$ is formed in the system. The compound melts at 560 +- 10°C. X-ray diffraction data for this compound are presented. Solid state solubility of the compound in β-NaOH causes a depression in the temperature of the $\alpha \rightarrow \beta$ phase change. Liquidus data for 27 compositions in the NaOH-rich portion of the reciprocal system are reported. These data may be interpreted in terms of a ternary peritectic or a semi-eutectic. Ternary invariant temperatures were not measured. An apparent invariant at 285 +- 5°C is attributed to a disequilibrium eutectic reaction between NaOH and Na_2CO_3.

54032 **(NUREG/CR—3345) Seismic Safety Margins Research Programs. Assessment of potential increases in risk due to degradation of steam generator and reactor coolant pump supports.** Bohn, M.P.; Wells, J.E.; Shieh, L.C.; Cover, L.E.; Streit, R.L. (Lawrence Livermore National Lab., CA (USA)). Aug 1983. Contract W-7405-ENG-48. 105p. (UCID—19719). NTIS, PC A06/MF A01 - GPO. Order Number DE83016943.

Portions are illegible in microfiche products.

During the NRC licensing review for the North Anna Units 1 and 2 pressurized-water reactors (PWRs), questions were raised regarding the potential for low-fracture toughness of steam-generator and reactor-coolant-pump supports. Because other PWRs may face similar problems, this issue was incorporated into the NRC Program for Resolution of Generic Issues. The work described in this report was performed to provide the NRC with a quantitative evaluation of the value/impact implications of the various options of resolving the fracture-toughness question. This report presents an assessment of the probabilistic risk associated with nil-ductility failures of steam-generator and reactor-coolant-pump structural-support systems during seismic events, performed using the Seismic Safety Margins Research Program codes and data bases.

54033 **(NUREG/CR—3359-Vol.2) Physics of reactor safety. Quarterly report, April-June 1983. Volume II.** (Argonne National Lab., IL (USA)). Aug 1983. Contract W-31-109-ENG-38. 21p. (ANL—83-11-Vol.2). NTIS, PC A02/MF A01 - GPO. Order Number DE83018253.

This version of SAS4A/LEVITATE is now operating successfully for the most part and is being applied to analysis of the TREAT L6 and L7 experiments. Application of the RAS version of SAS4A/LEVITATE to an EOC-4 LOF case for the CRBR showed substantial axial fuel dispersal to occur within 100 ms after pin failure, with the dispersal becoming very large by 250 ms. Both fission gas and sodium vapor effects appeared to be important in this dispersal. Considerable improvements have been made in the development version of SAS4A/PLUTO2/LEVITATE relating to the way fission gas is handled. The BIFLO code for analysis of two-dimensional sodium boiling in a fuel assembly is being modified to implement a more implicit numerical formulation, an equation of state for pure vapor, and lateral heat conduction between sodium flow channels. In the area of single-phase code development work (COMMIX-1A; COMMIX-1B) the implementation of three turbu-

lence models and two different schemes have been completed. In the area of two-phase works, COMMIX-2 computer code, the efforts are continued in developing both models, the two-fluid model and the homogeneous equilibrium model with slip.

54034 **(NUREG/CR—3419) Experimental data report for Semiscale Mod-2B Power-Loss Test Series (Tests S-PL-1, -2, and -3).** Sackett, K.E.; Clegg, L.B. (EG and G Idaho, Inc., Idaho Falls (USA)). Aug 1983. Contract AC07-76ID01570. 60p. NTIS, PC E04/MF A01 - GPO. Order Number DE83017463.

Includes 6 sheets of 48x reduction microfiche.

This report presents test data recorded for Tests S-PL-1, -2, and -3 of the Semiscale Mod-2B Power Loss (PL) Test Series. These tests are the first of a series of Semiscale tests that represent a broad spectrum of offsite ac power loss transients ranging from an offsite power loss with a normal recovery to a station blackout (failure of onsite ac power) with various primary and/or secondary system failures. The objectives of these tests are to provide long and short term transient data for code assessment and development on events unique to offsite power loss transients; develop a data base on general plant response during loss-of-offsite power transients; and evaluate existing and potential recovery procedures such as feed and bleed for use when the steam generators are not available to remove decay heat.

54035 **(PNL-SA—10781) Application of the TEMPEST computer code for simulating hydrogen distribution in model containment structures.** Trent, D.S.; Eyler, L.L. (Pacific Northwest Lab., Richland, WA (USA)). Sep 1982. Contract AC06-76RL01830. 23p. (CONF-830103—45). NTIS, PC A02/MF A01. Order Number DE83002725.

From 2. international topical meeting on nuclear reactor thermal hydraulics (ANS); Santa Barbara, CA, USA (11 Jan 1983).

Portions are illegible in microfiche products.

In this study several aspects of simulating hydrogen distribution in geometric configurations relevant to reactor containment structures were investigated using the TEMPEST computer code. Of particular interest was the performance of the TEMPEST turbulence model in a density-stratified environment. Computed results illustrated that the TEMPEST numerical procedures predicted the measured phenomena with good accuracy under a variety of conditions and that the turbulence model used is a viable approach in complex turbulent flow simulation.

54036 **(SAND—83-0795C) Detonation of hydrogen-air mixtures.** Lee, J.H.S.; Knystautas, R.; Benedick, W.B. (Sandia National Labs., Albuquerque, NM (USA); McGill Univ., Montreal, Quebec (Canada). Dept. of Mechanical Engineering). 1983. Contract AC04-76DP00789. 9p. (CONF-830816—36). NTIS MF A01. Order Number DE83017820.

From International meeting on light-water reactor severe accident evaluation; Cambridge, MA, USA (28 Aug 1983).

Microfiche only, copy does not permit paper copy reproduction.

The detonation of a hydrogen-air cloud subsequent to an accidental release of hydrogen into ambient surroundings cannot be totally ruled out in view of the relative sensitivity of the hydrogen-air system. The present paper investigates the key parameters involved in hydrogen-air detonations and attempts to establish quantitative correlations between those that have important practical implications. Thus, for example, the characteristic length scale λ describing the cellular structure of a detonation front is measured for a broad range of hydrogen-air mixtures and is quantitatively correlated with the key dynamic detonation properties such as detonability, transmission and initiation.

54037 **(UCRL—53287) Evacuation emergency response model coupling atmospheric release advisory capability output.** Rosen, L.C.; Lawver, B.S.; Buckley, D.W.; Finn, S.P.; Swenson, J.B. (Lawrence Livermore National Lab., CA (USA)). 10 Jan 1983. Contract W-7405-ENG-48. 85p. NTIS, PC A05/MF A01. Order Number DE83018231.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

A Federal Emergency Management Agency (FEMA) sponsored project to develop a coupled set of models between those of the Lawrence Livermore National Laboratory (LLNL) Atmospheric Release Advisory Capability (ARAC) system and candidate evacuation models is discussed herein. This report describes the ARAC system and discusses the rapid computer code developed and the coupling with ARAC output. The computer code is adapted to the use of color graphics as a means to display and convey the dynamics of an emergency evacuation. The model is applied to a specific case of an emergency evacuation of individuals surrounding the Rancho Seco Nuclear Power Plant, located approximately 25 miles southeast of Sacramento, California. The graphics available to the model user for the Rancho Seco example are displayed and noted in detail. Suggestions for future, potential improvements to the emergency evacuation model are presented.

54038 (UTNL-R—0092, pp 98-114) **Analysis of pressure drop accidents in high temperature gas-cooled reactors.** Kameoka, T. (Tokyo Electrical Engineering Coll. (Japan)). May 1980. (In Japanese). NTIS (US Sales Only), PC A06/MF A01. (CONF-8002105—).

From Study meeting on heat transfer and structural problems in nuclear facilities; Tokai, Japan (4 Feb 1980).

Research and development are carried out on various problems in order to realize a multi-purpose, high temperature gas-cooled experimental reactor by Japan Atomic Energy Research Institute and others. In the experimental reactor in consideration at present, it is planned to flow helium at 1000 deg C and 40 atm. For the purpose, high temperature heat insulation structures are designed and developed, which insulate heat on the internal surfaces of pressure vessels and pipings. Consideration must be given to these internal heat insulation structures about the various characteristics in the working environmental temperature and pressure conditions, the measures for preventing the by-pass flow due to the formation of gaps and the abnormal leak of heat through the natural convection in the heat insulators and others. In this paper, the experimental results on the rapid pressure reduction characteristics of ceramic fiber heat insulation structures are reported. The ceramic fiber heat insulation structures have the features such as the application to uneven surfaces and penetration parts, the prevention of by-pass flow, and very low permeability. The problem is the restoring force after the high temperature compression. The experiment on rapid pressure reduction due to the accidental release of gas and the results are reported.

54039 **Research at full-scale: the HDR programme.** Scholl, K.H. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.)); Holman, G.S. (Lawrence Livermore National Lab., CA (USA)). *Nuclear Engineering International;* **28**: No. 336, 39-43(Jan 1983).

A description is given of the HDR (Heissdampfreactor or Superheated Steam Reactor) safety programme which represents a major research effort in the Federal Republic of Germany into LWR safety. The programme is carried out at the decommissioned HDR reactor (100 MW prototype BWR). This has been refitted to allow testing at 1:1 scale and the simulation of conditions representative of commercial LWRs. Studies of pressure vessel blowdown, earthquake and aircraft impact, vessel fracture behaviour, NDE methods and containment leak rates are reported.

54040 **(Trans-WH—548) Investigtion of the system behaviour of a pressurised-water reactor in loss-of-coolant accidents: the PKL experiment.** Hein, D.; Riedle, K. Translated from *Atomkernenergie/Kerntechnik ;* **42**: No. 1, vp(1983). 19p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83902908.

Portions are illegible in microfiche products.

Since 1977 the authors' firm has been carrying out investigations into the system behavior of a pressurized water reactor during a loss of coolant accident, using the PKL test facility. The tests, performed in a scaled-down simulation (1:134) of a 1300 MW reactor, have provided a large quantity of experimental data and supporting evidence of the effectiveness of emergency cooling systems in large-break accidents. For small-leak accidents, the investigations concentrated on heat transport from the core to the steam gener-

ators at different water inventories. The article reviews important aspects of the project.

54041 **Experimental and analytical investigation of uncovered core heat transfer under high pressure, low heat flux conditions.** Anklam, T.M. (Oak Ridge National Lab., TN (USA). Engineering Technology Div.). *Nuclear Engineering and Design;* 73: No. 3, 411-423(Dec 1982).

Experimental and analytical results are reported from two series of high pressure core uncovering experiments. It was determined that the uncovered core is cooled primarily by convection and radiation to dry steam and that droplets are confined to the immediate vicinity of the mixture level. Spacer grids substantially increased heat transfer at an downstream of the grid. A simple heat transfer model is presented which accurately predicts uncovered core heat transfer at modified wall Reynolds numbers greater than 2000. Results are expected to be of use in modelling small break loss of coolant accidents.

25 ENERGY STORAGE

REFER ALSO TO CITATION(S) 53849, 54125

2502 Compressed Gas

54042 **(CONS/NSF/42—1(Vol.2)) Preliminary feasibility evaluation of compressed-air-storage power systems. Volume II. Appendices, period June 1975-December 1976.** (United Technologies Research Center, East Hartford, CT (USA)). Dec 1976. 222p. (R—76-952161-5(Vol.2)(App.)). NTIS, PC A10/MF A01. Order Number DE83017640.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

One of the eleven appendices in this volume is abstracted separately. The remaining ten supply background information, including: a gas turbine component technology review, the FT50 industrial gas turbine (description and performance), turbocompressor design and sizing procedure, gas turbine manufacturing cost estimating program, detailed description of clutch operation, diffusion of air into water, two-phase flow analysis for vertical shaft, state-of-the-art performance program, real gas effects on compressed air storage power systems performance and design, and dynamic optimization of generating equipment mix. (LEW)

54043 (CONS/NSF/42—1(Vol.2), pp A.i-A.81) **Geologic concepts for cavern storage between Washington and Boston.** Farquhar, O.C. Dec 1976. NTIS, PC A10/MF A01.

In Preliminary feasibility evaluation of compressed-air-storage power systems. Volume II. Appendices, period June 1975-December 1976.

This study is on a regional level and covers the northeast corridor of the United States. Only hard rock formations are considered. Seven main types are potentially favorable-granite, gabbro, gneiss, anorthosite, massive schist, diorite, and amphibolite. About 50 named formations composed of these materials occur down to at least the proposed cavern depth of about one-half of a mile. Many are found west of a line drawn from Washington through Baltimore, Philadelphia, Trenton, and Newark to New York. Others are in southern New England. Their general distribution is shown on a series of sketch maps. Generally the favorable formations comprise large and uniform masses. Together they occupy almost one-fifth of the region. High ranking depends upon low permeability and stable rock conditions, both required for air-tight, sound caverns. About 450 formations are either doubtful or rejected. The former include greenstone, diabase, quartzite, and serpentinite. The latter include poorly consolidated units of the coastal plain, thin sedimentary and volcanic rocks of the Triassic basins, and other formations that are strongly jointed, inclined to be permeable, too thin, and deformed or deformable. Examples include argillite, sandstone, mixed strata, shale, limestone, conglomerate, and mudstone.

2503 Pumped Hydro

REFER ALSO TO CITATION(S) 53754

2506 Thermal

54044 **Method and apparatus for operating an improved thermocline storage unit.** Copeland, R.J. US Patent Application 6-429,740. 30 Sep 1982. 25p. Contract AC02-77CH00178.

A method and apparatus for operating a thermocline storage unit in which an insulated barrier member is provided substantially at the interface region between the hot and cold liquids in the storage tank. The barrier member physically and thermally separates the hot and cold liquids substantially preventing any diffusing or mixing between them and substantially preventing any heat transfer there between. The barrier member follows the rise and fall of the interface region between the liquids as the tank is charged and discharged. Two methods of maintaining it in the interface region are disclosed. With the structure and operation of the present invention and in particular the significant reduction in diffusing or mixing between the hot and cold liquids as well as the significant reduction in the thermal heat transfer between them, the performance of the storage tank is improved. More specifically, the stability of the interface region or thermocline is enhanced and the thickness of the thermocline is reduced producing a corresponding increase in the steepness of the temperature gradient across the thermocline and a more efficiently operating thermocline storage unit.

54045 **Some aspects of the computer simulation of conduction heat transfer and phase change processes.** Solomon, A.D. (Oak Ridge National Labs., TN). pp 457-470 of Computing methods in applied sciences and engineering, V. Glowinski, R.; Lions, J.L. (eds.). New York, NY; North-Holland Publishing Company (1982).

We discuss various aspects of phase change processes in materials including computer modelling, validation of results and sensitivity. In addition, we examine the possible incorporation of cognitive activities in computational heat transfer.

2509 Batteries

54046 **(CONF-831020—2) Comparative response of lead-acid and nickel/iron batteries to pulsed and constant-current loads.** DeLuca, W.H.; Tummillo, A.F.; Biwer, T.L.; Christianson, C.C.; Hornstra, F.; Yao, N.P. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 10p. NTIS, PC A02/MF A01. Order Number DE83017939.

From Electric Vehicle Council symposium and EXPO '83; Dearborn, MI, USA (4 Oct 1983).

Portions are illegible in microfiche products.

Improved lead-acid and nickel/iron batteries are currently being developed for use in electric vehicles. The response of these batteries to given discharge conditions differs due to the inherent characteristics of each system. The discharge capacity of the lead-acid system is reduced (>25%) at increased discharge rates and its internal resistance is a function of both depth-of-discharge (DOD) and discharge rate. However, open-circuit stand times (0.5 to 2.0 h) at DOD levels >50% reduce the internal resistance of the lead-acid system and provide a corresponding increase in its availability capacity. In comparison, the discharge capacity and internal resistance of the nickel/iron system are virtually independent of both discharge rate and open-circuit stand times during discharge. With pulsed-current loads, the available energy and power output of both battery systems are always less than those obtained with equivalent constant-current loads due to increased internal power losses. The nickel/iron system exhibits an internal inductance that is significantly greater than that for the lead-acid system thereby causing potentially damaging voltage transients. This paper describes the test procedures and system employed, presents the test data, and methods for predicting battery response, and discusses the results obtained.

54047 **(CONF-831020—3) Application features and considerations in advanced lead-acid and nickel/iron EV batteries.** Miller, J.F.; Rajan, J.B.; Lee, T.S.; Christianson, C.C.; Hornstra, F.; Yao, N.P. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 7p. NTIS, PC A02/MF A01. Order Number DE83017936.

From Electric Vehicle Council symposium and EXPO '83; Dearborn, MI, USA (4 Oct 1983).

In the development of advanced lead-acid and nickel/iron EV batteries, major efforts have focussed on improving specific energy, specific power, cycle life, and cost. Nonetheless, other battery characteristics related to application needs are also important features which must be considered during the battery development process. This paper describes various application features and improvements incorporated in these advanced lead-acid and nickel/iron EV batteries. Their volumetric energy density and packaging flexibility are presented: their charged-stand capabilities and energy efficiencies are reported; and development work on the safe control of battery off-gases and the implementation of single-point watering systems is discussed.

54048 **(DOE/ER/12032—02) Photon scattering and interaction analysis for interfacial corrosion and catalysis. Technical progress report, September 1, 1982-August 31, 1983.** Furtak, T.E. (Rensselaer Polytechnic Inst., Troy, NY (USA). Dept. of Physics). 1983. Contract AC02-82ER12032. 19p. NTIS, PC A02/MF A01. Order Number DE83018109.

Work continued on specifying the short range mechanism for surface enhanced Raman scattering one of the most powerful yet still poorly understood interfacial analysis techniques. It was determined that complexes, which involve the SERS active molecule, co-adsorbed anions, and a surface defect site, are primarily responsible for the chemical effect. Enhancement under these conditions occurs through charge transfer excitation at these sites which cover less than 3% of the available surface. Preliminary studies of the active site chemistry have been initiated including attempts to correlate the optical and catalytic activities of these sites. Additional work proceeded toward developing photovoltage spectroscopy, reflectance and ellipsometry, infrared emission, and extended x-ray absorption fine structure analysis as complementary tools with which to study microscopic interfacial structure.

54049 **(LBL—16514) Influence of heat-treatment and physicochemical properties on the electrochemical oxidation of carbon blacks in phosphoric acid.** Kinoshita, K. (Lawrence Berkeley Lab., CA (USA)). Aug 1983. Contract AC03-76SF00098. 19p. (CONF-8308116—1). NTIS, PC A02/MF A01. Order Number DE83017744.

From Workshop on the electrochemistry of carbon; Cleveland, OH, USA (17 Aug 1983).

Studies on the electrochemical oxidation of carbon blacks in concentrated phosphoric acid at 135 to 160°C will be reviewed. The objective of the paper is to provide some understanding of the electrochemical-oxidation mechanism and the influence of physicochemical properties on the oxidation rate of carbon blacks. The effects of heat-treatment on the surface area and crystal structure of carbon black and electrochemical-oxidation rate will be discussed.

54050 **(SAND—83-7122) Analysis of lead-acid battery accelerated testing data. Final report.** Clifford, J.E.; Thomas, R.E. (Battelle Columbus Labs., OH (USA)). Aug 1983. Contract AC04-76DP00789. 36p. NTIS, PC A03/MF A01. Order Number DE83017403.

Battelle conducted an independent review and analysis of the accelerated test procedures and test data obtained by Exide in the 3-year Phase I program to develop advanced lead-acid batteries for utility load leveling. Of special importance is the extensive data obtained in deep-discharge cycling tests on 60 cells at elevated temperatures over a 2-1/2 year period. The principal uncertainty in estimating cell life relates to projecting cycle life data at elevated temperature to the lower operating temperatures. The accelerated positive-grid corrosion test involving continuous overcharge at 50°C provided some indication of the degree of grid corrosion that might be tolerable before failure. The accelerated positive-material shedding test was not examined in any detail. Recommendations are made for additional studies.

54051 **Positive-electrode current collector for liquid-metal cells.** Shimotake, H.; Bartholme, L.G. US Patent Application 6-424,112. 27 Sep 1982. 17p. Contract W-31-109-ENG-38.

A current collector for the positive electrode of an electrochemical cell with a positive electrode including a sulfide. The cell also has a negative electrode and a molten salt electrolyte including halides of a metal selected from the alkali metals and the alkaline earth metals in contact with both the positive and negative electrodes. The current collector has a base metal of copper, silver, gold, aluminum or alloys thereof with a coating thereon of iron, nickel, chromium or alloys thereof. The current collector when subjected to cell voltage forms a sulfur-containing compound on the surface thereby substantially protecting the current collector from further attack by sulfur ions during cell operation. Both electroless and electrolytic processes may be used to deposit coatings.

54052 **Parasitic corrosion-resistant anode for use in metal/air or metal/O_2 cells.** Joy, R.W.; Smith, D.F. US Patent Application 6-420,052. 20 Sep 1982. 9p. Contract W-7405-ENG-48.

A consumable metal anode is described which is used in refuelable electrochemical cells and wherein at least a peripheral edge portion of the anode is protected against a corrosive alkaline environment of the cell by the application of a thin metal coating, the coating being formed of metals such as nickel, silver, and gold.

29 ENERGY PLANNING AND POLICY

REFER ALSO TO CITATION(S) 54192

54053 **(CONF-8208148—) Governor's energy conference - Hawaii's energy options for the 80s.** (Hawaii State Dept. of Planning and Economic Development, Honolulu (USA)). 1982. 277p. NTIS, PC A13/MF A01. Order Number DE83014621.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

Portions are illegible in microfiche products.

The purpose of the conference was to share with the people of Hawaii the latest knowledge in the fields of energy conservation, alternate energy development, and related legal and financial considerations. Representatives from government, private industry, and the scientific community were among the speakers. The conference program was presented in six sessions: public-sector conservation; private-sector conservation; public-sector alternate energy; private-sector alternate energy; liquid and gas fuels and fuel cells; and legal and financial considerations. At the luncheon and banquet sessions, nationally-known speakers discussed the Strategic Petroleum Reserve and global aspects of energy supply and demand. A separate abstract was prepared for each of 47 individual presentations.

54054 **(DOE/CS/50277—T2) Program for developing professional capabilities in energy-conservation policy analysis. Final report, September 1979-December 1980.** Sweeney, J.L.; Lau, L. (Stanford Univ., CA (USA)). Dec 1980. Contract FG03-78CS50277. 12p. NTIS, PC A02/MF A01. Order Number DE83018262.

The current program proceeds through the various stages of recruitment and training, internship, dissertation writing, and career assignment in an energy policy related field. Three years of experience is reported for the program which consists of five stages: recruitment of graduate students from the Stanford University Engineering-Economic Systems Department and Economics Department who have a strong technical education, outstanding analytic skills in economics, in modeling of complex systems, in optimization of resource allocation, and in analysis of decision alternatives; training of those recruited in the application of analytic techniques to energy policy questions; establishment and support of a professional fellowship program in energy policy analysis with the Department of Energy; supervision of students during their dissertation work after their internships have been completed; and launching of those professionally trained and experienced graduates into career assignments in energy policy related areas.

2901 Energy Analysis And Modeling

REFER ALSO TO CITATION(S) 54080, 54090

54055 (DOE/AD/06185—T1) Energy emergency handbook. (Faucett (Jack) Associates, Inc., Chevy Chase, MD (USA)). 1979. Contract AC01-78AD06185. 308p. NTIS, PC A14/MF A01. Order Number DE83017444.

Portions are illegible in microfiche products.

This Handbook identifies selected state and federal measures available to mitigate the impact of an energy emergency, and provides a comprehensive energy emergency communications directory. In the case of state remedial actions, particular emphasis has been placed on typical implementation procedures and likely impacts. The discussions of federal actions focus on initation and implementation procedures. The directory is designed to facilitate communications of all types (telephone, Telex, TWX, or facsimile) among key energy emergency officials in the federal and state governments.

54056 (EIR—485) 'Modal Splits' for safeguarding Switzerland's energy supply until the year 2000. Kypreos, S.; Van Berchem, P.; Wochele, J. (Eidgenoessisches Inst. fuer Reaktorforschung, Wuerenlingen (Switzerland)). Apr 1983. 99p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83751329.

Portions are illegible in microfiche products.

Energy-supply scenarios (Modal Splits) for Switzerland are investigated with the linear system optimation model MARKAL by assuming different kinds of economic growth and various energy price developments. MARKAL was developed within the "Energy Technology Systems Analysis Project" of the IEA. The perspectives of the energy demand were analysed by the University of Geneva and are used here as input for MARKAL. The role distribution of the energy sources are calculated for various scenarios as primary- end- and useful energy. The study supplies the cost-optimised energy supply system structure for every scenario - under the assumption of a non-influenced development until the year 2000.

2902 Economics And Sociology

REFER ALSO TO CITATION(S) 53444, 55340

54057 (CONF-8308113—3) Quest for ultimate reality and meaning: a scientist's view. Gilbert, T.L. (Argonne National Lab., IL (USA)). 1 Aug 1983. Contract W-31-109-ENG-38. 25p. NTIS, PC A02/MF A01. Order Number DE83017951.

From 2. biennial meeting of the Institute for Ultimate Reality and Meaning; Toronto, Canada (17 Aug 1983).

The theme of unity and diversity is developed in four parts. The first part is an examination of the relationship between unity and diversity in terms of the concepts of scale and resolution, using an imaginary journey in a shrinking spaceship from the cosmos to quarks in order to present the concepts in concrete terms. The second part is an examination of the roles of different fields of scholarship - aesthetics and the humanities, ethics, religion, and science - in coping with diversity and in gleaning the unity hidden in diversity. The third part is an examination of a philosophical problem, closely related to unity and diversity, that can be expected to play a central role in later stages of the URAM program: the question of what we mean by the word true. The fourth part is a discussion of the concept of reality from the epistemological viewpoint of the sciences, and how unity and diversity enter into this concept.

54058 (DOE/EIA—0380(83/08)) Petroleum marketing monthly. (USDOE Energy Information Administration, Washington, DC. Office of Oil and Gas). Aug 1983. 86p. NTIS, PC A05/MF A01 - GPO. Order Number DE83018257.

Monthly summaries of petroleum product statistics for the United States, Petroleum Administration for Defense Districts, and individual States are presented. Statistics are included for sales prices, sales volumes, and percentages of petroleum product sales. Statistics are summarized and each of the three subjects is detailed in separate sections.

54059 (DOE/NBM—3012064) Two types of values and their assessment by the collective interest. Intemann, P.R. (Oak Ridge National Lab., TN (USA)). 1982. Contract W-7405-ENG-26. 26p. NTIS, PC A03/MF A01. Order Number DE83012064.

Both economics and environmental assessment are fundamentally concerned with the assessment of value. To better understand the meaning of value, it can be helpful to categorize values into different types. One such categorization is to divide them into functional values and perceptual values. Functional value is assigned on the basis of how much something contributes to or takes from the proper operation of a system. Perceptual value is assigned on the basis of how much something pleases or displeases an individual. The difference between these two types is gradational rather than discrete. Furthermore, an element of the environment can be valued both functionally and perceptually. Alternative schemes of categorization are analogous. Explicit, factual, objective values are typically functional while implicit, judgmental, subjective values are typically perceptual. In a mixed economy the responsibility of government in influencing the assessment of value is different for the two different types. For functional values, evaluation and resulting action by the government as a representative of the collective interest are based on maintenance or improvement of the system. This corresponds to Hardin's notion of averting the tragedy of the commons. For perceptual values, evaluation by the government is based on widening the choice available to individuals. This corresponds to Davidoff's and Reiner's theory of planning. The significance of this difference is explored using wilderness preservation policy as an example.

2903 Environment, Health, And Safety

REFER ALSO TO CITATION(S) 53384, 54024, 54068, 54176, 54896, 54903, 54905, 54951, 54957, 54959, 54960

54060 (PB—83-200873) Area development plan for Radio Island. (North Carolina Coastal Energy Impact Program, Raleigh (USA); Roberts and Eichler Associates, Inc., Atlanta, GA (USA)). Jun 1982. 107p. NTIS, PC A06/MF A01.

An Area Development Plan for Radio Island and its environs is presented. The different ways are identified in which the available waterfront/port areas in the Atlantic Beach-Morehead City-Beaufort Harbor area are being utilized or could be developed. Economic, community and environmental impacts that are potentially associated with the various development options are assessed. An overall concept plan for the development of the port/harbor area that best meets the diverse needs of the region and its residents is detailed. Specific recommendations regarding the future development of Radio Island are made. The current controversy is over the development of a coal export terminal on Radio Island. This project provides a policy guide that identified future growth objectives based on the consideration and balancing of various interests.

54061 (PB—83-204065) Buying a better environment: cost-effective regulation through permit trading. Technical report. Joeres, E.F.; David, M.H. (Wisconsin Univ., Madison (USA). Sea Grant Inst.). 1982. 280p. NTIS, PC A13/MF A01.

This conference on transferable discharge permits marked another important milestone in an exciting and, I hope, environmentally and economically beneficial program. The authors TDP work at Wisconsin has become a model of university-industry-government cooperation. It involves research and outreach on an important common problem. What started out as a rather esoteric University of Wisconsin Sea Grant research project has moved quite rapidly to the stage where it could become a part of national resource management policy. The State of Wisconsin has now accepted the idea of transferable discharge permits for water and has begun to use it as a technique for dealing with the Fox River industrial complex.

54062 **(PNL—4581) Assessment of cold-climate environmental research priorities.** States, J.B. (Pacific Northwest Lab., Richland, WA (USA)). Apr 1983. Contract AC06-76RL01830. 64p. NTIS, PC A04/MF A01. Order Number DE83017745.

The Environmental Protection Agency (EPA) has consistently recognized that cold regions pose unique environmental problems. This report sets forth the conceptual framework and research plans for several high priority research areas. It provides the fundamental basis for implementation of the EPA Cold-Climate Environmental Research Program. This three- to five-year program encompasses both short- and long-term research of high relevance to the EPA and to the cold regions that it serves.

2904 Natural Resources

REFER ALSO TO CITATION(S) 54164, 54176, 54237

54063 **(NP—3770398) Storage sites of solid mineral raw materials in Austria and their importance.** (Bundesministerium fuer Handel, Gewerbe und Industrie, Vienna (Austria)). 1979. 113p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83770398.

Portions are illegible in microfiche products; With 6 separate maps.

The booklets 1-4 of the series "The basis of raw material supply" are meant to create a better understanding of the "concept" for the supply of mineral raw- and -primary material for Austria. Booklet 2 deals with the domestic storage sites. An attempt is made to determine regionally the individual main sectors of the raw materials suitable for building purpose.

54064 **(NP—3770400) Use and resources of mineral raw material, statistical data on the raw material supply of Austria.** (Bundesministerium fuer Handel, Gewerbe und Industrie, Vienna (Austria)). 1981. 201p. (In German). NTIS (US Sales Only), PC A10/MF A01. Order Number DE83770400.

The booklets 1 to 4 of the series "The basis of Raw material supply" are intended to create a better understanding of the "Concept for the supply of Austria with raw- and primary materials". Booklet 1 describes the usage and resources of mineral raw material in alphabetical order. Each chapter is subdivided in several sections dealing with the characterstics, usage and usual commercial products and quality demands of the raw material. Then the essential ore minerals are listed. A brief section is dedicated to the classification of storage sites. In the section "Regional distribution" the most important storage sites are listed with regard to their deposits. A short outline of those regions are given where economic concentrations may be still be hoped for. Substitution possibilities are dealt with finally. Basic data on domestic production, imports and exports of numerical raw- and basic material cover the following sectors. 1) Raw materials of the non-iron metal industry, 2) precious metals, high-strength materials, gases, rare elements and compounds, 4) industrial minerals, 5) non-metallic minerals.

54065 **(NP—3770404) Importance and possibilities of secondary cycles (recycling), substitution and innovation in mineral raw and primary material supply.** (Bundesministerium fuer Handel, Gewerbe und Industrie, Vienna (Austria)). 1980. 26p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83770404.

Part 1-4 of the series "The basis of raw materials supply" is intended to bring about a better understanding of the "Concept for the supply of Austria with mineral raw- and primary materials". Part 3 deals with recovery of raw material from old- and waste material as an important contribution to an extension of the supply's basis and to an improvement of raw material utilization.

54066 **(NP—3770405) Concept for supplying Austria with mineral raw- and primary material.** (Bundesministerium fuer Handel, Gewerbe und Industrie, Vienna (Austria)). 1981. 93p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83770405.

As early as 1975 the Federal Government announced in its governmental declaration the setting-up of a concept for supplying Austria with mineral raw- and primary material. Based on this declaration the present concept was worked out excluding those raw materials which exclusively serve energetic purposes. The concept is based on a comprehensive analysis of the present state. Taking the worldwide situation and the domestic developments into consideration it contains recommendations on measures for improving and safeguarding the supply of mineral raw and primary material to Austria. The text of the concept especially in the analytical part is rather concise. Details are given in the four accompanying bookets (booklet 1-4) of the series "The basis of raw material supply".

54067 **(NP—3770406) International developments on the sector of mineral raw material.** (Bundesministerium fuer Handel, Gewerbe und Industrie, Vienna (Austria)). 1981. 42p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83770406.

Many nations see clearly now that the raw materials on this earth are limited and non-regenerative and that international economic relations need to be basically reconsidered. The concerned public of the Western industrialised nations asks the question whether the developing countries will be able to bring about the end of a epoch of cheap raw material's import the industrialized countries by adopting the example of OPEC in the oil reactor and using their economic power. Even though there are only a few raw materials where the developing countries hold the stronger position and even though the world does have reserves their share in world exports is already important because their domestic consumption is quite low. Starting with the United Nations various national and international bodies have begun to deal with the raw material problem.

54068 **(PB—83-196469) Price, socioeconomic, and climatic influences on residential water use in southern arizona. Completion report, October 1980-September 1981.** Billings, R.B.; Day, W.M. (Arizona Univ., Tucson (USA)). Nov 1982. 102p. NTIS, PC A06/MF A01.

Several demand models for water in the presence of block rate price schedules were theoretically examined and empirically estimated. The alternative price concepts are average price and marginal price/difference. Difference is the implicit block rate tax or subsidy due to the availability-of-service charge and/or intramarginal blocks in the rate structure. Three variants of marginal price/difference were used. (1) marginal price and difference derived directly from the rate schedule for each quantity; (2) marginal price and difference derived from a regression of the total revenue function against corresponding values of quantity for each rate schedule; and (3) marginal price and difference as in (1) above, but with omission of observations where quantity is 'close' to the discontinuities in the rate schedule. This third variant of the model should produce unbiased estimates by eliminating observations where measurement error or omitted variables may cause quantity to fall in the 'wrong' use block, resulting in incorrect assigned values for marginal price and difference.

54069 **(PB—83-218396) Water resources of Manatee County, Florida. Water-resources investigations.** Brown, D.P. (Geological Survey, Tallahassee, FL (USA). Water Resources Div.). Mar 1983. 122p. (USGS/WRD/WRI—83-014; USGS/WRI—81-74). NTIS, PC A06/MF A01.

Rapid development of Manatee County in southwest Florida is creating water-resource problems. The report presents an evaluation of the water resources and potential effects of water-resource developments. Most streams in the county have small drainage basins and low yields. The principal aquifers are the surficial, minor artesian, and the Floridan. The Floridan aquifer is the major source of irrigation water in the county. The minor artesian aquifer is a highly developed source of water for small rural supplies. Withdrawals of 20 to 50 million gallons per day from the Floridan aquifer since the 1950's have caused declines in the potentiometric surface of about 20 to 50 feet. The quality of ground water is good except in the coastal and southern parts of the county.

2905 Research, Development, Demonstration, And Commercialization

REFER ALSO TO CITATION(S) 54108, 54951, 55327

54070 (NCEI—0059) North Carolina Energy Institute. Annual report, 1982. (North Carolina Dept. of Commerce, Raleigh (USA). Energy Div.). 1982. 85p. NTIS, PC A05/MF A01. Order Number DE83017783.

Portions are illegible in microfiche products.

This is the final report from the North Carolina Energy Institute, which ended its activities on June 30, 1982. The seven most significant projects involved four sources of alternative energy for which North Carolina has special advantages: wood, peat, methanol, and passive solar. During this year, two completed projects provided support for an expansion of the state energy role of wood. In one, detailed technical and economic data were developed and published for year-round use of waste wood by the large furniture industry. In the other, it was shown that the pollution levels of polycyclic organic matter (a potentially hazardous constituent of wood smoke) from a well-designed industrial furnace are probably equal to or lower than those from coal-fired furnaces. Two projects identified new ways to utilize the peat to displace traditional fuels. In one, stable, pumpable slurries of peat mixed with heating oil were prepared and burned in one short test of a fluid burner. In another, peat was successfully gasified in a fluid bed pilot plant to produce a synthesis gas for preparing liquid fuels such as methanol. Methanol will be prepared from peat in North Carolina in the first synthetic fuel plant in the US supported by Synthetic Fuel Corporation. The plant will produce 64 million gallons of methanol per year, in a facility to be built in Washington County by Peat Methanol Associates. Several important projects supported the growing use of passive solar design concepts in new North Carolina buildings. Six high school and technical institute building projects showed that passive solar homes need not be significantly more expensive than conventional designs. Further, from an evaluation of passive solar features in state-constructed buildings, one extremely attractive example was developed and built as an addition to the NCSU McKimmon Center.

54071 (NP—3770402) Political framework conditions of research and technology. Riesenhuber, H. (Staatsbuergerlichen Vereinigung 1954 e.V., Koeln (Germany, F.R.)). Dec 1981. 46p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83770402.

The author presented his ideas on the basic questions of growth and the development of natural science and technology in several lectures before the participants - managers of all branches of economy - of the Political Seminar. A summary of all these lectures is presented here. The author shows that growth, progress and technology are necessary - also for the developing countries. He explains and shows that the quality of growth is changed quicker by the constraints of the market than by political considerations. He has no doubt that politics are responsible for an early and reliable implementation of the ecological framework conditions. The author is opposed to an overemphasis on governmental subsidies. Project subsidising is rejected for reasons of politics and experience; their bureaucracy impairs the market mechanisms and as a result the technical development. His criticism was specially addressed to the lack of success in public research policy and the incapability to set priorities on the basis of the development. He also criticises the lack of practical application of the research results.

2906 Nuclear Energy

REFER ALSO TO CITATION(S) 53581, 53600, 53643, 53867, 53952, 54024, 54028

54072 (AECB—1130) Approach for determining the acceptable levels of nuclear risk. (Atomic Energy Control Board, Ottawa, Ontario (Canada); Department of Supply and Services, Ottawa, Ontario (Canada). Bureau of Management Consulting). Mar 1978. 40p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83703437.

The objective of this study was to develop a methodology for determining the acceptable levels of risk with respect to nuclear energy. It was concluded that the Atomic Energy Control Board should identify the interest groups that affect its choice of an acceptable level of risk, determine their expectations, and balance the expectations of the various groups such that the resulting acceptable level of risk is still acceptable to the Board. This would be done by interviewing experts on the subject of nuclear safety, developing and pretesting a public questionnaire, and surveying the public on acceptable cost-risk combinations.

54073 (DOE/RA/50259—T5) Mathematical model of a utility firm. Final technical report, Part I. (Polysystems Analysis Corp., Huntington, NY (USA)). 21 Aug 1983. Contract AC01-80RA50259. 115p. NTIS, PC A06/MF A01. Order Number DE83016984.

Utility companies are in the predicament of having to make forecasts, and draw up plans for the future, in an increasingly fluid and volatile socio-economic environment. The project being reported is to contribute to an understanding of the economic and behavioral processes that take place within a firm, and without it. Three main topics are treated. One is the representation of the characteristics of the members of an organization, to the extent to which characteristics seem pertinent to the processes of interest. The second is the appropriate management of the processes of change by an organization. The third deals with the competitive striving towards an economic equilibrium among the members of a society in the large, on the theory that this process might be modeled in a way which is similar to the one for the intra-organizational ones. This volume covers mainly the first topic.

2907 Transport And Storage

REFER ALSO TO CITATION(S) 53734, 54151

2908 Waste Heat Utilization

REFER ALSO TO CITATION(S) 54184, 54190

54074 (CONF-830731—1) Industrial waste exchange: a mechanism for saving energy and money. Gaines, L.L. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 19p. NTIS, PC A02/MF A01. Order Number DE83017954.

From Hazardous materials management conference and exhibition; Philadelphia, PA, USA (12 Jul 1983).

Although considerable savings of both energy and money are possible through waste exchange, several major impediments limit the number of actual exchanges that take place. These impediments include the lack of economical separation technology, the small quantities of material available at each site, restrictive or uncertain regulation, and lack of knowledge on the part of potential waste users. None of these barriers is insurmountable if appropriate action is taken.

54075 Industrial waste heat for district heating. Heitner, K.L.; Brooks, P.P. (U.S. Nuclear Regulatory Commission, Washington, DC 20555). *Energy Engineering;* 79: No. 6, 7-17(Nov 1982).

Presents 2 bounding evaluations of industrial waste heat availability. Surveys waste heat from 29 major industry groups at the 2-digit level in Standard Industrial Codes (SIC). Explains that waste heat availability in each industry was related to regional product sales, in order to estimate regional waste heat availability. Evaluates 4 selected industries at the 4-digit SIC level. Finds that industrial waste heat represents a significant energy resource in several urban areas, including Chicago and Los Angeles, where it could supply all of these areas residential heating and cooling load. Points out that there is a strong need to evaluate the available waste heat for more industries at the 4-digit level. Urges further studies to identify other useful industrial waste heat sources as well as potential waste heat users.

2910 Conservation

REFER ALSO TO CITATION(S) 54053, 54084, 54092, 54124, 54130, 54131, 54132, 54133, 54134, 54135, 54136, 54137, 54139, 54143, 54144, 54145, 54147, 54150, 54151, 54159, 54162, 54166, 54175, 54177, 54178, 54179, 54191, 54193

54076 (CONF-8208148—, pp 14-18) **Federal conservation programs in the 80's.** Chiogioji, M.H. (Dept. of Energy, Washington, DC). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

Hawaii has received $5.49 million from the federal government since 1972 to assist in the development and implementation of energy-conservation technologies and practices. Despite the state's exemplary progress, an estimated savings of 1.6 trillion Btu's during 1981, federal funds are now being diverted to other areas of need and the private sector is being asked to take over the further development of alternative energy sources. Some of the Federal initiatives in energy conservation are highlighted, including: the Schools and Hospitals Program, the Energy-Related Inventions Program, Integrated Community Energy Systems (ICES), the Building Energy Performance Standards Program, and the Residential Conservation Service Program. These programs have encouraged the ten most energy-intensive US industries to improve their energy conservation by 17.6% and enable residential energy consumption per household to decrease by 20%.

54077 (CONF-8208148—, pp 23-29) **Energy-conservation program: University of Hawaii at Manoa.** Koehler, P.W. (Univ. of Hawaii, Monoa). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

The energy-conservation program at the University of Hawaii, Manoa Campus, began in 1973-74 with the 1974-75 fiscal year being their peak year of consumption. The past fiscal year compared to 1974-75 showed a 20.78% decrease in kWh/gsf, resulting in a cost avoidance of $6-7 million during the period. Air conditioning, which accounts for about 60 to 70% of the electricity consumed, was the first target for conservation efforts followed by lighting, electrical management, and various other quick-fix projects. Plans are highlighted for the 1982-83 and 1983-84 fiscal years that will emphasize energy management as well as energy conservation. 1 figure, 1 table.

2920 Supply, Demand, And Forecasting

REFER ALSO TO CITATION(S) 53445, 54089, 54090

54078 (CONF-8208148—, pp 8-12) **Hawaii's energy options for the 80's.** Ariyoshi, G.R. (Governor of the State of Hawaii, Honolulu). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

In an attempt to reduce its high dependency on imported oil, the state of Hawaii has been intensifying its efforts toward developing alternative sources of energy for the future. The Hawaii State Plan, the State Energy Plan, and the Hawaii Integrated Energy Assessment are three official documents that set forth the goals, suggest implementation, and provide strategic prospects for the State energy management and development. Conservation is felt to be the greatest means for achieving self-sufficiency in the near term. The array of renewable resources available in the state include sugarcane bagasse, wind power, geothermally produced electricity, photovoltaics, hydroelectric power, and ocean thermal energy conversion. As a current measure, Hawaii is lobbying strenuously to have a national Strategic Petroleum Reserve established in the state to lessen the severity of potential oil supply disruptions in the future.

54079 (CONF-8208148—, pp 202-204) **Global aspects of energy supply and demand.** Yergin, D.H. 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

Dr. Yergin, one of the co-editors of the Harvard Business School Project Report, Energy Future, notes that Hawaii's isolation makes it vulnerable to energy-supply disruption - but, at the same time, it possesses a resource base richly endowed with potential renewable energy resources. He notes further that the world attitude toward crude-oil supplies has adjusted well to the history of rapid change in oil prices and insecurity surrounding supply from OPEC. Several factors explain the existing positive position: non-OPEC oil production has experienced dramatic increases; the industrial world became 16% more energy-efficient between 1973 and 1981; and the world's dire economic situation. The author feels a strong economic recovery will most affect energy demand in the future.

54080 (DOE/EIA—0354(82)) **State Energy Overview.** (USDOE Energy Information Administration, Washington, DC. Office of Energy Markets and End Use). Oct 1983. 452p. NTIS, PC A20/MF A01 - GPO. Order Number DE83017934.

An overview of selected energy-related data for the United States, for each state, and for the District of Columbia is presented. Included are the quantities of energy produced and consumed, estimates of fuel reserves, the value of nonrenewable fuels produced by type, energy expenditures, and consumer prices. Also provided for each state are selected demographic and energy-related information that have been ranked and expressed as a percent of the national total. This overview provides a ready reference and a quick access to selected state energy information and state rankings for various socioeconomic and energy items. The State Energy Overview is arranged in five sections. The first section presents United States totals and an overview of state rankings. The second depicts data for the 50 states and the District of Columbia. The glossary presents definitions germane to this publication and the fourth section describes methodology and includes remarks concerning the information and methods used to estimate 1982 consumption numbers. The fifth section presents sources of data and information for this publication. A summary of each section is included.

54081 (PB—83-174136) **Alternative energy demand futures to 2010.** (National Research Council, Washington, DC (USA). Committee on Nuclear and Alternative Energy Systems). 1979. 293p. NTIS, PC A13/MF A01.

This report was written in support of a comprehensive study of the nation's prospective energy economy during the period 1985-2010. The goal of the study was to assist in the formulation of energy policy. Specifically this report explores the range of energy demand that is possible out to the year 2010, using plausible sets of demand-shaping assumptions; examines the technological opportunities for saving energy and their socio-economic implications; suggests institutional and behavioral factors that can constrain or accelerate energy demand, and; recommends policy initiatives that can affect demand and conservation.

54082 (PB—83-174144) **U.S. energy supply prospects to 2010.** (National Research Council, Washington, DC (USA). Committee on Nuclear and Alternative Energy Systems). 1979. 230p. NTIS, PC A11/MF A01.

The report was written in support of a comprehensive study of the nation's prospective energy economy during the period 1985-2020. The goal of the study was to assist in the formulation of energy policy. Specifically, this report was written to determine the extent to which domestic supplies of energy could be produced, should that production become, and covered: (1) The availability of primary energy resources in the United States, and the prospects for their recovery as a function of cost and technology; (2) the institutional, financial, and political considerations that might restrain or encourage production, conversion, and distribution; and (3) the nonenergy materials, manufacturing capacity, manpower, capital, land, and water required for a range of energy- supply estimates.

2930 Policy, Legislation, And Regulation

REFER ALSO TO CITATION(S) 53762, 53859, 54055, 54078, 54091, 54094, 54109, 54112, 54959

54083 **(BNL—33533) DAMOS: a data and modelling system for energy policy analysis.** Reisman, A.W. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 16p. (CONF-830698—2). NTIS, PC A02/MF A01. Order Number DE83017579.

From International Association of Energy Economists conference; Washington, DC, USA (9 Jun 1983).

A Data and Modelling System structure (DAMOS) is described which is designed to describe the influences of regional or federal energy-policy initiatives on local energy-consumption patterns. The DAMOS structure is designed to provide to localities useful and relevant energy and economic data which are consistent with federal energy initiatives and national energy and economic data sources. The DAMOS approach utilizes existing government-sponsored and commercially available data bases to form the core of the information set. The models are formulated to take advantage of the local detail inherent in the available data. User-supplied local information is accepted by the system if desired. An option exists to project estimates and spatial distribution of energy use in a base year into the future, either by using economic forecasts provided by the energy planner or by interfacing with a macroeconomic model. A discussion of the potential for district-heating implementation in Albany, New York illustrates some capabilities of the DAMOS methodology.

54084 (CONF-8208148—, pp 93-96) **State energy planning.** Keith, K.M. (Dept. of Planning and Economic Development, Honolulu). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

Hawaii has in effect a planning system and has available the natural resources to effect a shift in dependency from nonrenewable to renewable energy sources. The Hawaii State Plan, legislated in 1978, is the only one of its kind in the nation. The details of the plan are discussed and the reasons that make planning for the future a necessity are enumerated.

54085 (CONF-8208148—, pp 130-133) **Energy programs for Pacific territories.** Yoshihara, T. (Dept. of Energy, Honolulu, HI). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

The energy problems faced in the US Territories of the Pacific (Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, and the Trust Territory of the Pacific Islands) are addressed. This area's critical, nearly complete dependence on imported oil for energy supply led Congress to include a provision in the Omnibus Territories Act of 1980 which requires the development of comprehensive energy plans with the goal of maximizing the use of indigenous energy resources to reduce reliance on imported oil. The most-promising technologies for the area are solar photovoltaic, biomass, wind power, ocean thermal energy conversion, solar ponds, and geothermal in a few specific locales.

54086 (CONF-8208148—, pp 250-256) **Public Utility Regulatory Policies Act of 1978 (PURPA) and the State of Hawaii Public Utilities Commission (PUC) regulations.** Bethea, R. (Carlsmith, Carlsmith, Wichman and Case, Honolulu, HI). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

The history and background are given of the Public Utility Regulatory Policies Act of 1978 (PURPA) and Hawaii's companion Public Utilities Commission (PUC) regulations. The two sets of regulations differ on avoided-cost pricing standard appproaches and how to define capacity. These differences are elaborated upon.

54087 (CONF-8208148—, pp 257-261) **Concerns in establishing PURPA regulations.** DuPont, C.S. (Hawaii Public Utilities Commission, Honolulu). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

Although Hawaii has complied with all of the procedural requirements of the Public Utilities Regulatory Policies Act of 1978 (PURPA) on paper, implementing them has been difficult due to financial inadequacies. The author feels a strong cooperative effort is necessary to find the funds necessary, thus avoiding the unpleasant realities of future fuel needs based on nonrenewable resources.

54088 **(DOE/ER/10178—2) US-West European energy and security relations.** (Ohio State Univ., Columbus (USA)). 1982. Contract FG02-80ER10178. 42p. (CONF-8211118—Summ.). NTIS, PC A03/MF A01. Order Number DE83017287.

From 5. Ohio State University Washington conference on energy and national security; Arlington, VA, USA (16 Nov 1982).

Portions are illegible in microfiche products.

Summaries are presented of the following sessions: (1) failure, successes, and consequences of crisis responses; (2) developing and coping with government policies affecting energy supplies; (3) the Soviet-West European gas pipeline - is it worth the price; (4) diversity of energy resources and policies; (5) hang together or hang separately - allied responses to future energy crises; and (6) US-West European energy and security relations - concluding comments.

54089 **NEPP-IV: DOE's Fourth Biennial National Energy Policy Plan.** *Energy Economics, Policy and Management;* 3: No. 1, 69-71(Sum 1983).

In preparing the Fourth Biennial National Energy Policy Plan (NEPP-IV), the Department of Energy made a number of major revisions in its energy production, conversion, and consumption forecasts. Two tables compare the NEPP-IV projections with those of NEPP-III, which was submitted in 1981.

2940 Fossil Fuels

REFER ALSO TO CITATION(S) 53384, 53411, 53413, 53425, 53444, 53445, 53446, 54058, 54060, 54105, 54163

54090 **(BNL—51568) Review of coal-supply models and forecasts: a critique of the current state-of-the-art.** Newcombe, R. (Brookhaven National Lab., Upton, NY (USA)). Aug 1982. Contract AC02-76CH00016. 58p. NTIS, PC A04/MF A01. Order Number DE84000848.

The outputs from various coal supply modeling systems influence decisions in diverse areas (e.g., the Department of Interior's establishment of coal leasing goals for federal lands; the Department of Energy's Fossil Energy Research and Development programs). Widely employed coal supply models combine dependence on data streams of doubtful accuracy and appropriateness with tenuous methodological assumptions. Similarities in the structural assumptions of the models and in assumed values of driving variables have resulted in similar forecasts. Many policymakers feel these models project energy futures with implausibly low coal prices. This report provides an overview of ongoing analyses of coal supply models at the National Center for Analysis of Energy Systems at Brookhaven National Laboratory, and includes discussion of model philosophies, overview of methodologies (comparative anatomy), comparison of conceptual structure, review and evaluation of recent forecasts, and recommendations.

54091 (CONF-8208148—, pp 48-55) **Strategic Petroleum Reserve and Hawaii.** Spreyer, F.C. (Pacific Resources Inc., Washington, DC). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

The history of Hawaii's petitioning for a Strategic Petroleum Reserve is covered as is the legislation which mandated the reserves in the first place, the Energy Policy and Conservation Act (EPCA) of 1975. Hawaii's remote location makes its vulnerability to supply disruptions critical and it is felt that only through the continued active participation of citizens and political leaders will its pleas for a Strategic Petroleum Reserve be heard by Congress in Washington.

2950 Hydrogen And Synthetic Fuels

REFER ALSO TO CITATION(S) 53733, 53734, 53768

2960 Electric Power

REFER ALSO TO CITATION(S) 53752, 53811, 54086, 54087, 54118, 54119, 54180, 54181

54092 (CONF-8208148—, pp 56-65) **Electricity's role in promoting conservation in Hawaii.** Lloyd, A.S. (Hawaiian Electric Co., Honolulu). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

Due to the large increases in the cost of producing electricity in Hawaii, the long-term goal for the state is to substantially reduce its dependence on imported petroleum products. In the immediate future conservation is thought to be the answer, and electricity is seen to have an important role to play in conservation efforts. Electricity makes difficult energy sources available for practical use. Recently available high-efficiency electrical devices are discussed including lighting innovations, motors and adjustable speed drives, energy-management equipment, air conditioning with waste-heat recovery, new residential appliances, and heat-pump water heaters. 1 figure, 1 table.

54093 (CONF-8208148—, pp 118-122) **Hawaii Deep-Water Cable Program: electrical-grid-system integration investigations.** Chapman, G.A.; Okura, G.N. (Parsons Hawaii, Honolulu). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

The Hawaii Deep Water Electrical Transmission Cable Demonstration Program (HDWC Program), initially developed in late 1979 and with estimated completion due in January 1985, and the Electrical Grid System Integration Investigations, one of the principal tasks of the HDWC Program, are both briefly discussed. The goals of the HDWC Program are to: (1) determine the feasibility of using a submarine cable system to electrically intertie the Hawaiian Islands; (2) determine the problems and solutions for installing and maintaining a deep-water cable; and (3) develop a commercial cable criteria document that can be used by private and government agencies to implement the cable systems.

54094 (CONF-8208148—, pp 262-264) **Electric energy as a competitive business.** St. John, G.E. (Amfac Inc., Honolulu, HI). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

The history of the electric-power industry is given to show the need for regulation prior to the oil embargo of 1973. The author explains this opinion that a competitive power-production business and a regulated power distribution system would better fit today's needs.

54095 (DOE/EIA—0191(82)) **Cost and quality of fuels for electric utility plants: 1982 annual.** (USDOE Energy Information Administration, Washington, DC. Office of Coal, Nuclear, Electric and Alternate Fuels). Aug 1983. 192p. NTIS, PC A09/MF A01 - GPO. Order Number DE83017635.

Portions are illegible in microfiche products.

This series of summary reports contains annual information on the cost and quality of fossil fuel receipts to electric utility plants in the contiguous United States and District of Columbia with a combined capacity of 25 megawatts or greater. Data for Alaska and Hawaii are contained in Tables 56 and 57. These publications beginning with the 1976 annual summary report, include plant-by-plant data grouped in alphabetical order by utility.

54096 (DOE/EIA—0226(83/06)) **Electric Power Monthly.** (USDOE Energy Information Administration, Washington, DC. Office of Coal, Nuclear, Electric and Alternate Fuels). Jun 1983. 46p. NTIS, PC A03/MF A01 - GPO. Order Number DE83017852.

The Electric Power Monthly (EPM) includes comprehesive and current information about the electric utility industry in the United States. The data presented in this report were collected and published to fulfill data collection and dissemination responsibilities in the Federal Energy Administration Act of 1974 (P.L. 93-275). Data regarding the average cost to utilities of coal, heavy oil, gas, and all fossil fuels are included in a new table beginning with this issue. More detailed data and the Technical Notes can be obtained from the new Electric Power Quarterly.

54097 (DOE/EIA—0397(83/1Q)) **Electric Power Quarterly, January-March 1983.** (USDOE Energy Information Administration, Washington, DC. Office of Coal, Nuclear, Electric and Alternate Fuels). Jul 1983. 312p. NTIS, PC A14/MF A01 - GPO. Order Number DE83018243.

The Electric Power Quarterly (EPQ), a new series in the EIA statistical publications, provides electric utilities' plant-level information about the cost, quantity, and quality of fossil fuel receipts, net generation, fuel consumption and fuel stocks. The EPQ contains monthly data and quarterly totals for the reporting quarter. The data presented in this report were collected and published by the EIA to fulfill its responsibilities as specified in the Federal Energy Administration Act of 1974 (P.L. 93-275). This edition of the EPQ contains monthly data for the first quarter of 1983. In this report, data collected on Form EIA-759 regarding electric utilities' net generation, fuel consumption, and fuel stocks are presented for the first time on a plant-by-plant basis. In addition, quantity, cost, and quality of fossil fuel receipts collected on the Federal Energy Regulatory Commission (FERC) Form 423 are presented on a plant-by-plant basis.

54098 (DOE/RA/50259—T2) **Mathematical model of a utility firm. Final technical report, Part IIA.** (Polysystems Analysis Corp., Huntington, NY (USA)). 21 Aug 1983. Contract AC01-80RA50259. 87p. NTIS, PC A05/MF A01. Order Number DE83017033.

This volume is part of a project aimed at developing an understanding of the dynamical processes that evolve within an electric utility firm, and without it. The volume covers organizational dynamics and many-person symmetric games. (DLC)

54099 (DOE/RA/50259—T3) **Mathematical model of a utility firm. Executive summary.** (Polysystems Analysis Corp., Huntington, NY (USA)). 21 Aug 1983. Contract AC01-80RA50259. 25p. NTIS, PC A02/MF A01. Order Number DE83016985.

The project was aimed at developing an understanding of the economic and behavioral processes that take place within a utility firm, and without it. This executive summary, one of five documents, gives the project goals and objectives, outlines the subject areas of investigation, discusses the findings and results, and finally considers applications within the electric power industry and future research directions. (DLC)

54100 (DOE/RA/50259—T4) **Mathematical model of a utility firm. Final technical report, Part III.** (Polysystems Analysis Corp., Huntington, NY (USA)). 21 Aug 1983. Contract AC01-80RA50259. 53p. NTIS, PC A04/MF A01. Order Number DE83017018.

Portions are illegible in microfiche products.

This project is aimed at understanding the economic and behavioral processes that take place within a utility firm, and without it. This volume covers dynamics of economic systems (Phase II of the project): economic equilibrium theory, discrete economics, exchange economics, production economics, approach to equilibrium.

54101 (DOE/RA/50259—T6) **Mathematical model of a utility firm. Final technical report, Part IIB.** (Polysystems Analysis Corp., Huntington, NY (USA)). 21 Aug 1983. Contract AC01-80RA50259. 89p. NTIS, PC A05/MF A01. Order Number DE83017019.

Portions are illegible in microfiche products.

The aim of this project was to develop an understanding of the dynamical processes that evolve within an electric utility firm,

and without it. This volume covers organizational dynamics and control, and planning under uncertainty. (DLC)

54102 **(NP—3770396) DVG report 1981.** (Deutsche Verbundgesellschaft e.V., Heidelberg (Germany, F.R.)). Jul 1982. 29p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83770396.

Portions are illegible in microfiche products.

The present report informs on the activities of the interconnecting electric utilities association and its members as well as on the tasks and organization of the association. Its main task is to promote the extension of interconnected economy in the German power supply. Furthermore it promotes cooperation between the German members of the interconnecting association and with the interconnected undertakings of the Western European countries as well as the cooperation of the German interconnecting undertakings with the other branches of the energy economy and industry.

54103 **(PB—83-193805) Generalized network flow model with application to power supply-demand problems.** Liu, C. (California Univ., Berkeley (USA). Operations Research Center). Aug 1982. 32p. (ORC—82-10). NTIS, PC A03/MF A01.

A generalization of the conventional network flow model to a very general F-flow model is provided. The max-flow-min-cut theorem is then generalized. The theorem is used to derive a necessary and sufficient condition for feasibility of the multi-terminal supply-demand problem based on the F-flow model. As an application, the electric power supply-demand problem is discussed from the F-flow point of view.

54104 **(TVA/OP/TSEC—82/1) TVA's dispersed generation protection requirements - what do they mean.** Cleland, J.O. (Tennessee Valley Authority, Chattanooga (USA)). 26 Oct 1981. 11p. NTIS, PC A02/MF A01. Order Number DE83910817.

This commentary attempts to explain in greater detail TVA's Supplemental Safety and System Protection Requirements Applicable to Owners of Qualified Production Facilities. These requirements constitute section C of TVA's present Dispersed Power Production Policy.

54105 **(UAH—345) Commercial energy costs for SOLCOST data bank cities, Winter 1982-1983.** Holder, R.R. (Alabama Univ., Huntsville (USA). Kenneth E. Johnson Environmental and Energy Center). 1983. Contract FG01-79CS30013. 128p. NTIS MF A01. Order Number DE83015946.

Microfiche only, copy does not permit paper copy reproduction.

A task team has compiled this listing of commercial costs for cities included in the SOLCOST Data Bank. This listing provides current information on utility rates in the United States for people in the solar heating and cooling industry. The commodities covered in the document are electricity and natural gas. The data in this document is limited to commercial rates. The document shows for each city the 1980 population, the 30 year mean annual heating and cooling degree days based on 65°F, and the mean daily solar radiation in Btu-per-square-foot based on a global horizontal value. It also shows the company name for each commodity with calculations for the cost of each commodity including all charges and taxes. These calculations include costs for small and large commercial companies for electricity and natural gas. Weighted averages are calculated for each state, DOE Regional Solar Energy Center, the ten federal regions, and the United States.

54106 **Spatial price duopoly under uniform delivered pricing.** Schuler, R.E. (State of New York Public Service Commission, Albany); Hobbs, B.F. *Journal of Industrial Economics;* **31**: No. 1/2, 175-187(Sep-Dec 1982).

This analysis shows that spatial price competition between duopolists charging uniform delivered prices does ultimately lead to the constant oscillation of prices suggested by Edgeworth under the assumption of zero price conjectural variation. However, the bounds on this price oscillation lie above marginal cost, p_e = p/sub N/ = 0, and below the collusive price level. This ultimate dynamic cycle is achieved regardless of the initial prices charged, and the dynamic paths pass through the collusive price point only if both initial prices are above the collusive level. Otherwise, the collusive point can never be found by accident. Some different conjectural variation is required.

2980 Consumption And Utilization

REFER ALSO TO CITATION(S) 54080, 54149

2990 Unconventional Sources And Power Generation

REFER ALSO TO CITATION(S) 53761, 53762, 53765, 53766, 53767, 53768, 53769, 53772, 53773, 53778, 53788, 53789, 53791, 53792, 53795, 53796, 53797, 53800, 53801, 53811, 53817, 53830, 53831, 53832, 53835, 53840, 53842, 53845, 54053, 54085, 54118, 54119, 54185

54107 (CONF-8208148—, pp 97-109) **Overview of renewable-energy development in Hawaii.** Shupe, J.W. (Hawaii Natural Energy Inst., Honolulu). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

The state of Hawaii, which derives 92% of its energy needs from imported crude oil, is extremely vulnerable to oil shortages and high prices in the world energy market. Hawaii, however, is also blessed with a variety and abundance of renewable energy resources and has recently begun an earnest development of these resources in an effort to minimize its heavy dependence on imported oil. The main development emphasis has concentrated on direct solar radiation, ocean thermal energy conversion (OTEC), biomass resources, wind energy, and geothermal resources. It is projected that Hawaii will continue to progress steadily toward its ultimate future goal of energy self-sufficiency. 12 references, 1 figure, 3 tables.

54108 (CONF-8208148—, pp 147-148) **Overview of the wind-energy project at Kahuku Seafood Plantation.** Williams, R.L. (Pacific Analysis Corp., Honolulu, HI). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

Pacific Analysis Corporation's Kahuku Seafood Plantation wind farm is discussed. The project, which now consists of four ESI 50-kW wind turbines of the eight planned, will contribute approximately 80% of the energy-intensive aquafarms' power requirements on an annual basis in the 18.5-mph wind regime. Project specifics and installation problems are summarized.

54109 (CONF-8208148—, pp 265-268) **Resource rights: geothermal and solar energy.** Kamins, R.M. 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

The Hawaiian governing property rights to geothermal and solar energy resources are explained. Geothermal ownership must be resolved by the courts, which will have to decide if a private owner of land possesses the right to exploit underground geothermal pools or if the resources are the property of the people of Hawaii. It is anticipated by the author that the state of Hawaii will eventually establish a legal regime to protect the right of access to sunlight as solar technology becomes more widely used.

54110 **(DOE/ET/20647—T1) DOE renewable energy program. Final report.** (Meridian Corp., Falls Church, VA (USA)). 1982. Contract AC01-80ET20647. 43p. NTIS, PC A03/MF A01. Order Number DE83017858.

A brief overview is given of the Department of Energy's Solar and renewable energy program accompanied by copies of viewgraphs as attachments.

54111 **(NP—3770403) Alternative sources of energy.** (Amt der Salzburger Landesregierung (Austria)). Jul 1982. 110p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83770403.

The 10th economic meeting which took place on the 4th of March 1982 issued important impulses for the utilization of domestic energy sources. 16 experts gave lectures for 5 hrs on the latest state of technology of the utilization of alternative energies from sun, wind, geothermal energy, biomass, sewage sludge, waste, heat pumps and the usage of cogeneration units. The 170 participants from the sectors politics, industry, science, media gained a comprehensive insight into the possibilities of utilizing these energy sources in the Salzburg region.

54112 **(PB—83-218339) Renewable energy technologies: models in the energy planning for Puerto Rico.** Acevedo, J.H. (Puerto Rico Univ., Mayaguez. Dept. of Civil Engineering). 1982. 30p. NTIS, PC A03/MF A01.

Puerto Rico now depends for 99% of its energy needs on petroleum. The nuclear alternative is not politically acceptable, so Ocean Thermal Energy Conversion (OTEC) combined with photovoltaics is the most promising renewable resource for energy. Wind power generation is not as economic since huge turbines are required for relatively little outputs of power. Biomass is also a viable alternative. Reduction in the dependence on oil is not only economically advantageous, but will also reduce environmental pollution.

30 DIRECT ENERGY CONVERSION

3001 Mhd Generators

54113 **(DOE/ET/10815—84) Numerical investigation of recirculation in the UTSI MHD combustor.** Schulz, R.J.; Lee, J.J.; Giel, T.V. Jr. (Tennessee Univ., Tullahoma (USA). Space Inst.). Sep 1983. Contract AC02-79ET10815. 48p. NTIS, PC A03/MF A01. Order Number DE83017533.

Portions are illegible in microfiche products.

Numerical studies were carried out to investigate the gross structure of flow in cylindrical combustors. The combustor configurations studied are variations of a working design used at the University of Tennessee Space Institute to burn pulverized coal at temperatures in excess of 3000K for generation of a plasma feeding a magnetohydrodynamic channel. The numerical studies were conducted for an isothermal fluid; the main objective of the calculations was to study the effect of the oxidant injection pattern on the gross structure of recirculating flows within the combustor. The calculations illustrate the basic features of the flow in combustors of this type and suggest implications for the injection of coal and oxidizer in this type of combustor.

54114 **(DOE/ET/15614—T4) 1000-hour MHD anode test: executive summary, May-August 1981.** (Avco-Everett Research Lab., Everett, MA (USA)). 1981. Contract AC22-80ET15614. 19p. NTIS, PC A02/MF A01. Order Number DE83017743.

Portions are illegible in microfiche products.

Various anode electrodes for MHD channels were recently operated successfully for over 1000 hours under the same electrical, thermal and chemical stress conditions as would exist in a commercial MHD power plant, including the requisite fractions of sulfur and coal-ash carryover. The most successful electrodes were made of water-cooled copper with platinum and/or stainless steel cladding in critical areas. Based on measured erosion rates for the 1000 hours of operation actually achieved, an ultimate lifetime in the range 5000 to 8000 hours can be extrapolated for these electrodes.

54115 **(DOE/MC/19077—T3) Development of a hot-gas-cleanup system for integrated coal-gasification/molten-carbonate fuel-cell power plants. Quarterly progress report, April-June 1983.** Lyke, S.E.; Sealock, L.J. Jr.; Roberts, G.L. (Pacific Northwest Lab., Richland, WA (USA)). Jun 1983. Contract AC21-82MC19077. 128p. NTIS, PC A07/MF A01. Order Number DE83017563.

Portions are illegible in microfiche products.

The program to develop a hot gas cleanup system for integrated coal gasification/molten carbonate fuel cell power plants is divided into the following six tasks: (1) project plan and design of experiments; (2) exploratory and supporting studies; (3) Design and bench-scale development reactor and associated equipment; (4) ordering of equipment and construction of Reactor and Associated equipment; (5) bench-scale H_2S, COS, and HCl absorption and sorbent regeneration; and (6) engineering and economic assessment of the process. The research is to be performed during the first 12 months. Upon approval of DOE Tasks 3, 4, 5 and 6 will be conducted during the second year of the project. The project will develop a process for removal of HCl and sulfur compounds from hot fuel gas using molten salts supported on a solid substrate. Experimental work will consist of equilibrium studied, laboratory-scale sorbent reaction studies, and bench-scale packed-bed absorber tests. These investigations will be followed by an engineering and economic assessment of the process. Work in the first year of the project will consist of equilibrium studies and laboratory-scale sorbent reaction studies. Progress is reported. (WHK)

54116 **(DOE/NASA/3255—1(7-81)) MHD generator off-design performance and NO/sub x/ chemical-kinetics analysis.** Wilson, D.R.; Lee, Y.M. (Texas Univ., Arlington (USA). Dept. of Aerospace Engineering). Jul 1981. Contract AI01-77ET10769. 193p. (NASA/CR—168204). NTIS, PC A09/MF A01. Order Number DE83017708.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This study had three major objectives. The original NASA/UTA MHD channel flow code MHD79 was upgraded to include (1) a slag layer model, (2) a rough-wall skin-friction model, and (3) a B-wall velocity and enthalpy profile development model. A discussion of the analytical models together with the results of typical calculations to illustrate the capability of the revised code are presented. Second, a hybrid Lax-Wendroff/Method of Characteristics, transient MHD channel flow code was developed. The development of the analytical model and the results of several code validation calculations are presented. Limited results of application of the code to the simulation of flow transient for the AEDC/HPDE MHD generator are also given. Finally, the results of comparisons between computer code predictions and experimental data for the AEDC/HPDE Faraday generator and the NASA Lewis Research Center hall generator are presented. The overall comparisons were good although several areas where further improvements are needed in the computer code were found. 30 references.

3005 Fuel Cells

REFER ALSO TO CITATION(S) 53770, 54049, 54052

54117 **(CONF-831104—1) Solid-oxide fuel cells.** Fee, D.C.; Ackerman, J.P. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 4p. NTIS, PC A02/MF A01. Order Number DE83017925.

From National fuel cell seminar; Orlando, FL, USA (13 Nov 1983).

Solid-Oxide Fuel Cell (SOFC) systems offer significant advantages for a variety of fuels and applications. The simplicity and high efficiency of a direct reforming, contaminant-tolerant power system is advantageous for small natural gas or volatile liquid-fueled utility and industrial cogeneration plants, as well as residential use. The further gain in efficiency from the incorporation of a bottoming cycle in large-scale plants is advantageous for coal-fueled utility baseload or industrial cogeneration facilities. Development of SOFC components is well advanced. The present effort focuses on improving cell life and performance as well as integration of cells into an array. Progress is reported. (WHK)

54118 (CONF-8208148—, pp 229-230) **Fuel cells for power plants.** Higgins, E.C. (Hawaiian Electric Co., Honolulu). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

In the near future it is anticipated that fuel cells will supply electricity to urban areas where power plants are unacceptable for

environmental reasons. The history of fuel cells, their description and how they work, and present research on their further development are all discussed. The advantages of fuel cells include high efficiency, fuel flexibility, low pollutant emissions, quiet operation, relatively low capital investment, and quick installation.

54119 (CONF-8208148—, pp 231-236) **40-kW on-site fuel-cell unit.** Clark, T.A. (GASCO, Inc., Honolulu, HI). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

An on-site fuel-cell unit is defined as an on-site energy system which produces a-c electric power and recoverable thermal energy at the same time. One of the best features of the fuel cell is shown to be its ability to maximize efficiency from a 35% load to 100% load rather than from the impracticality of constant load efficiency. It is stressed that fuel-cell manufacturing and use will only be realized when marketing data proves a need. 2 figures, 1 table.

54120 (CONF-8308120—1) **Solid-oxide fuel-cell performance.** Fee, D.C.; Zwick, S.A.; Ackerman, J.P. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 10p. NTIS, PC A02/MF A01. Order Number DE83017926.

From 2. solid oxide fuel cell workshop; Upton, NY, USA (16 Aug 1983).

Two models have been developed to describe the performance of solid-oxide fuel cells: (1) a cell model which calculates cell performance for various conditions of temperature, current density, and gas composition; and (2) a systems model which performs detailed heat and mass balances around each component in a power plant. The cell model provides insight into the performance tradeoffs in cell design. Further, the cell model provides the basis for predicting fuel cell performance in a power plant environment as necessary for the systems code. Using these two tools, analysis of an atmospheric pressure, natural gas fueled, internally reforming power plant confirms the simplicity and increased efficiency of a solid oxide fuel cell system compared to existing plants.

54121 (PB—83-188672) **On-site fuel cell field test support program. Annual report Jul 81-Jun 82.** Staniunas, J.W.; Merten, G.P. (United Technologies Corp., South Windsor, CT (USA). Power Systems Div.). Sep 1982. 107p. NTIS, PC A06/MF A01.

United continued this past year to assist the utilities and the Gas Research Institute in the review and selection of sites for data monitoring. Each of these sites will be instrumented and its energy requirements monitored and analyzed for one year prior to the selection of 40 Kilowatt fuel cell field test sites. Analyses in support of the selection of sites for instrumentation continued to show that many building sectors offered considerable market potential. These sectors include nursing home, health club, restaurant, industrial, hotel/motel and apartment.

54122 **Electrically insulating and sealing frame.** Guthrie, R.J. US Patent Application 6-424,111. 27 Sep 1982. 12p. Contract AC02-79ET15440.

A combination gas seal and electrical insulator is described having a closed frame shape interconnects a fuel cell stack and a reactant gas plenum of a fuel cell generator. The frame can be of rectangular shape including at least one slidable spline connection in each side to permit expansion or contraction consistent with that of the walls of the gas plenum and fuel cell stack. The slidable spline connections in the frame sides minimizes lateral movement between the frame side members and sealing material interposed between the frame and the fuel cell stack or between the frame and the reactant gas plenum.

54123 **Rapidly refuelable fuel cell.** Joy, R.W. US Patent Application 6-420,053. 20 Sep 1982. 10p. Contract W-7405-ENG-48.

A rapidly refuelable dual cell of an electrochemical type is described wherein a single anode cooperates with two cathodes and wherein the anode has a fixed position and the cathodes are urged toward opposite faces of the anodes at constant and uniform force. The associated cathodes are automatically retractable to permit the consumed anode remains to be removed from the housing and a new anode inserted between the two cathodes.

32 ENERGY CONSERVATION, CONSUMPTION, AND UTILIZATION

REFER ALSO TO CITATION(S) 54076

54124 (AD-A—129732/4) **Energy monitoring and control systems inspection guidelines. Final report.** Cosiol, J.; Bomar, F.; Bamford, R. (Kling-Lindquist, Inc., Philadelphia, PA (USA)). Dec 1982. 183p. NTIS, PC A09/MF A01.

This report presents guidelines which can assist the inspector in conducting an inspection of energy monitoring and control system (EMCS) hardware and software during the construction and testing phases of the EMCS project. These guidelines present construction management considerations, describe the inspection sequence for a generic EMCS during the construction period, and provide an overview of the tests to be conducted in the factory and on-site.

3201 Buildings

REFER ALSO TO CITATION(S) 53758, 54077, 54189

54125 (AD-A—125180/0) **Energy storage criteria handbook. Final report mar 81-jun 82.** Hull, J.R.; Cole, R.L.; Hull, A.B. (Argonne National Lab., IL (USA)). Oct 1982. 485p. NTIS, PC A21/MF A01.

The purpose of this handbook is to provide information and criteria necessary for the selection and sizing of energy storage technologies for use at U.S. Naval facilities. The handbook gives Naval base personnel procedures and information to select the most viable energy storage options to provide the space conditioning (heating and cooling) and domestic hot water needs of their facility. The handbook may also be used by contractors, installers, designers, engineers, architects, and manufacturers who intend to enter the energy storage business. The handbook is organized into three major sections: a general section, a technical section, and an example section. While a technical background is assumed for the latter two sections, the general section is simply written and can serve as an introduction to the field of energy storage. The technical section examines the following energy storage technologies: sensible heat storage, latent heat storage, cold storage, thermochemical storage, mechanical storage, pumped hydro storage, and electrochemical storage. The example section is limited to thermal storage and includes examples for: water tank storage, rockbed storage, latent heat storage, and cold water storage.

54126 (AD-A—126617/0) **Corrosion evaluation of stove pipe materials and surface treatments. Final report.** Falco, J.J.; Levy, M. (Army Materials and Mechanics Research Center, Watertown, MA (USA)). Feb 1983. 23p. (AMMRC-TR—83-7). NTIS, PC A02/MF A01.

Due to the severe corrosion encountered by fielded blue-oxide finished mild steel stove pipes, the corrosion behavior of alternate stove pipe materials/coatings was assessed. Assessment was based on results of corrosion tests which simulated the operational environment. The data indicated that 310 stainless steel, aluminized, galvanized, and chromium plated mild steels can extend stove pipe service life significantly. Aluminized mild steel appears to be the most cost-effective substitute for the presently used material.

54127 (AD-A—128748/1) **Control strategies for reducing heating, ventilating, and air conditioning (HVAC) energy consumption in single buildings. Final report Jan-Jun 82.** Kirts, R.E. (Naval Civil Engineering Lab., Port Hueneme, CA (USA)). Mar 1983. 44p. (NCEL-TN—1658). NTIS, PC A03/MF A01.

This report presents a discussion of the most common control strategies and equipment used to reduce the amount of energy consumed by heating, ventilating, and air conditioning (HVAC) systems. Two basic concepts are discussed: bringing the existing control system up to design specification while retaining the original control strategy, and employing a new control strategy. The new control strategies analyzed are scheduled start-stop, day-night

setback, optimum start-stop, dead band control, duty cycling, demand limiting and load shedding, economizer and enthalpy cycles, scheduled temperature reset, chiller control and chilled water reset, boiler control and hot water temperature reset, and condenser water temperature reset. Recent developments in HVAC control system hardware, such as pneumatic systems, electropneumatic systems, digital-electronic systems, and microcomputer-based control systems, are also discussed. The strategies are described and compared to each other in terms of cost effectiveness. The BLAST computer program is used to evaluate the various control strategies. The results illustrate the energy-saving potential of simple strategies, such as night and weekend setback and scheduled start-stop, which are inexpensive to implement and should be installed in most buildings. The most complex strategy is not necessarily the most effective due to the interactions between the building, climate, and HVAC system.

54128 **(AD-A—129963/5) Analysis of energy conservation alternatives for standard Army building. Final report.** Hittle, D.C.; O'Brien, R.E.; Percivall, G.S. (Army Construction Engineering Research Lab., Champaign, IL (USA)). Mar 1983. 144p. (CERL-TR-E—183). NTIS, PC A07/MF A01.

This report describes energy conservation alternatives for five standard Army building designs. By surveying maps of major Army installations and using the Integrated Facilities System, the most popular designs were determined to be a two-company, rolling-pin-shaped barracks for enlisted personnel; a Type 64 barracks; a motor repair shop; a battalion headquarters and classroom building; and an enlisted personnel mess hall. The Building Loads Analysis and System Thermodynamics (BLAST) energy-analysis computer program was used to develop baseline energy consumption for each design based on the building descriptions and calibrated by comparison with the measured energy usage of similar buildings. Once the baseline was established, the BLAST program was used to study energy conservation alternatives (ECAs) which could be retrofit to the existing buildings. The ECAs included closing off air-handling units, adding storm windows, adding 2 in. (0.051 m) of exterior insulation to the walls, partially blocking the windows, adding roof insulation, putting up south overhangs, installing programmable thermostats, recovering heat from exhaust fans, installing temperature economizers, replacing lights, and installing partitions between areas of differing temperature.

54129 **(BMFT-FB-T—83-159) Central heat pump units - problems of heat output control.** Amrhein, W.; Daniel, W.; Kragl, W. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Aug 1983. 103p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83751328.

The purpose of this project is to investigate how far the various methods of regulating the output of heat pumps are better in respect of the energetic and economical benefits compared with the existing on-off control. Based on a feasibility study, three methods for regulating the thermal output were selected, promising maximum energy savings at low capital costs. They were practically tested with heat pumps and their efficiency was investigated. The best methods are based on the step-by-step variation of the coolant mass flow. The most effective way to achieve this is by means of parallel connection of compressors or by varying the speed with the help of a driving motor with changeable poles. The savings in electrical energy and hence the charges are not extraordinary. Therefore, it is necessary to employ only simple and economical control elements to improve the economical effeciency of heat pumps. With further increase of energy prices they may attain more and more importance.

54130 (CONF-8208148—, pp 30-31) **Energy conservation in State buildings.** Nakamura, C.T. (State of Hawaii, Dept. of Accounting and General Services, Honolulu). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

The Department of Accounting and General Services (DAGS) has direct jurisdiction over 20 buildings in Hawaii. Two of the design criteria for new State office buildings are discussed. The first requires that each new building must hold consumption to not more than 50,000 Btu's of energy per square foot per year. Second, an Energy Savings Opportunities Report must be submitted for each of the three stages of the design process. DAGS concludes that the only way to assure continued energy savings in existing buildings is to have constant monitoring and surveillance via electronic means.

54131 (CONF-8208148—, pp 66-72) **Energy management in a health-care institute.** Yoneda, M. (Queen's Medical Center, Honolulu, Hawaii). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

Insomuch as hospitals are responsible for nearly 15% of the energy used in all commercial buildings, various energy management efforts have been undertaken at The Queen's Medical Center in Honolulu, Hawaii. The program goal is to fully provide all of its required energy needs with less energy input without ever compromising the quality or quantity of patient care. Queen's was a recipient of a Federal Grant from the National Energy Conservation Policy. The requirements and conditions necessary for participation in the program are reviewed as they are felt to be valuable building blocks for any energy-management program. It is recommended that the installation of capital equipment for major energy savings be considered only after all operational and maintenance measures have been thoroughly implemented and reviewed.

54132 (CONF-8208148—, pp 73-75) **Proper engineering for energy conservation.** Kohloss, F.H. (Frederick H. Kohloss and Associates, Inc., Honolulu, HI). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

Very few of the mainland solutions for diminishing energy waste in buildings are applicable in Hawaii which has no space-heating needs nor fluctuating weather patterns. Air conditioning is the largest target for energy savings in Hawaii, with lighting running a distant second. The two most-important ways to save on air conditioning are by moderating the operating hours and providing adequate maintenance. The author feels energy management can be achieved with more common sense and fewer sophisticated devices.

54133 (CONF-8208148—, pp 80-88) **How to organize an energy-conservation program for new and existing buildings.** Lum, F.Y.S. (Ferris & Hamig, Inc., Honolulu, HI). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

Two case studies illustrate the author's method for organizing energy-conservation programs for new and existing buildings. He feels a problem-solving approach is needed to relate and integrate the many complex issues into a consolidated whole. A flow chart lists the eight steps in the method: (1) define the objective; (2) define the problem; (3) establish a data base consisting of factual inputs; (4) review and develop feedback; (5) determine alternative solutions; (6) make recommendations; (7) implement the recommendations; and (8) verify that the problem was solved and the objectives attained.

54134 **(DOE/BP—180) Issue backgrounder: the health impacts of home weatherization.** (Bonneville Power Administration, Portland, OR (USA)). Sep 1983. 25p. NTIS, PC A02/MF A01. Order Number DE83017908.

This booklet describes the air pollutants commonly found indoors, how they might affect your health, and what you can do about them. It also explains what the Bonneville Power Administration is doing to control these pollutants and how BPA's home weatherization program is affected by this problem.

54135 **(DOE/CE—0045) Supplement to: March 1982 consumer products efficiency standards, engineering analysis and economic analysis documents.** (USDOE Assistant Secretary for Conservation and Renewable Energy, Washington, DC). Jul 1983. 402p. NTIS MF A01. Order Number DE83017539.

Microfiche only, copy does not permit paper copy reproduction. Original copy available until stock is exhausted.

The following product types are discussed: refrigerators and refrigerator freezers, freezers, furnaces and boilers, and central air conditioners. Some topics included are: hybrid evaporators, cost efficiency relationships, high-efficiency compressor substitution, pulsed combustion, all aluminium heat exchanger, and high-efficiency two-speed compressor.

54136 **(DOE/CE/64832—T1) Project to analyze the potential energy and cost savings of changes in the DHHS: minimum requirements of construction and equipment for hospital and medical facilities.** (American Hospital Association, Chicago, IL). Nov 1982. Contract FG01-83CE64832. 9p. NTIS, PC A02/MF A01. Order Number DE83018215.

Portions are illegible in microfiche products.

A program is outlined to project the cost benefit of implementing code modifications using computer simulated models, to pilot and evaluate the implementation of the revisions, and to develop a technical guide to implementing the five most widely applicable and cost-effective modifications. Included are: the background and purpose, project workplan, tasks and activities, and the qualifications of the American Hospital Association. (MHR)

54137 **(DOE/CS/20531—T8) Equivalency methodology: issues, findings, and recommendations.** (Harbridge House, Inc., Washington, DC (USA)). Jun 1980. Contract AC01-79CS20531. 124p. NTIS, PC A06. Order Number DE83015062.

Paper copy only, copy does not permit microfiche production.

Under Title III of Public Law 94-385 (the Energy Conservation Standards for New Buildings Act of 1976), a state may certify that the building code or other construction control mechanism of the state or one or more of its localities meets or exceeds the building energy performance standards (BEPS) and thereby escape the sanction imposed under the Act. Prior to certification, the state must evaluate its state or local code to determine whether it is equivalent to the BEPS. This study began with a preliminary identification of recurrent administrative provisions in building and energy codes that appeared to present problems to an equivalency determination. Selection of these potential issue areas was based on a review of background materials and model codes. Background materials include studies prepared pursuant to the BEPS program and other materials that describe and analyze the construction process. After the initial identification of potential issue areas, a survey of selected state and local codes was completed to test preliminary assumptions. A state-specific resource guide to legislative enactments and administrative regulations is included to enable the reader to locate specific state laws pertaining to the regulation of construction.

54138 **(DOE/NBM—3018111) Large climate-moderating envelopes for enclosed structures. A preliminary evaluation of energy-conservation potential.** Giles, G.E.; Park, J.E.; Wendt, R.L. (Oak Ridge National Lab., TN (USA)). 1982. Contract W-7405-ENG-26. 9p. NTIS, PC A02/MF A01. Order Number DE83018111.

One method of reducing the energy consumption of one or more buildings is to isolate the buildings within a large envelope. The envelope moderates the effects of sun, wind and precipitation and provides a more benign climate for habitation, commerce and, in some climates, agricultural activities. Results of a preliminary study of the qualitative energy conservation benefits are given for a large climate-moderating envelope (LCME). The study included the effects of weather, fluid circulation and radiant transport within the envelope and energy storage in the earth mass beneath the LCME. Based on model studies for selected days, the annual energy savings for summer-dominated climates was estimated to be ~ 70%. The energy savings for a winter-dominated climate LCME were estimated to be somewhat smaller, ~ 40%.

54139 **(LBL—13883-Rev.) Convective heat transfer in buildings: recent research results. Rev.** Bauman, F.; Gadgil, A.; Kammerud, R.; Altmayer, E.; Nansteel, M.W. (Lawrence Berkeley Lab., CA (USA)). Oct 1982. Contract AC03-76SF00098. 36p. (CONF-830102—1-Rev.). NTIS, PC A03/MF A01. Order Number DE83017524.

From ASHRAE semi-annual meeting; Atlantic City, NJ, USA (23 Jan 1983).

Recent experimental and numerical studies of convective heat transfer in buildings are described, and important results are presented. The experimental work has been performed on small-scale, water-filled enclosures; the numerical analysis results have been produced by a computer program based on a finite-difference scheme. The convective processes investigated in this research are: (1) natural convective heat transfer between room surfaces and the adjacent air, (2) natural convective heat transfer between adjacent rooms through a doorway or other openings, and (3) forced convection between the building and its external environment (such as wind-driven ventilation through windows, doors, or other openings). Results obtained at Lawrence Berkeley Laboratory (LBL) for surface convection coefficients are compared with existing ASHRAE correlations, and differences can have a significant impact on the accuracy of building energy analysis computer simulations. Interzone coupling correlations obtained from experimental work are in reasonable agreement with recently published experimental results and with earlier published work. Numerical simulations of wind-driven natural ventilation are presented. They exhibit good qualitative agreement with published wind-tunnel data.

54140 **(NP—3770399) Energy balance of buildings.** Steinmueller, B. (Technische Univ. Berlin (Germany, F.R.). Fachbereich Umwelttechnik). 15 Apr 1982. 231p. (In German). NTIS (US Sales Only), PC A11/MF A01. Order Number DE83770399.

Portions are illegible in microfiche products; Thesis.

Models for simplified dynamic calculation of the energy balance of buildings are set up, examined in theory and by experiments and applied to studies of one-family houses with various heat characteristics. The basis of the studies is a building model developed by the Philips Research Labs in Aachen by means of which the dynamic properties of a building's interior are expressed as a thermal capacity. This model simplification leads to a considerably easier calculation and has the further advantage of allowing one to interpret numerical results as analytical solutions by using simple building characteristics such as - internal thermal capacity, external heat flow and relaxation time.

54141 **(PB—83-162396) Economic feasibility of alternative utility-sponsored weatherization programs: the case of baltimore gas and electric company. Final report.** Dubinsky, R.; Morgenstern, R.D. (Urban Inst., Washington, DC (USA)). Aug 1982. 244p. NTIS, PC A11/MF A01.

The study consists of three principal parts. The first major part is a survey and review of the experiences of weatherization programs around the country. The survey was used to develop a set of weatherization program designs and analytic assumptions, particularly program participation rates. The second major part of the study is an analysis of the energy and capacity savings that would likely result from the various program alternatives. The final major section of the study brings together the benefits and costs sides of the analysis to determine overall program impacts on program participants, non-participants and the Baltimore Gas and Electric Company system.

54142 **(PB—83-232728) Evaluation of the use of multicomponent refrigerants in gas-fired heat pumps. Final report Jan 82-Feb 83.** Mathiprakasam, B. (Midwest Research Inst., Kansas City, MO (USA)). Jul 1983. 72p. NTIS, PC A04/MF A01.

The use of multicomponent refrigerants in heat pump cycles was evaluated theoretically and experimentally; in the theoretical evaluation, a vapor compression cycle using refrigerant mixtures was formulated and analyzed. The results of this analysis show that the achievable improvement in efficiency using optimum mixtures would be on the order of 20 to 25%. A laboratory test stand was

also built and used in tests conducted with both pure refrigerants and refrigerant mixtures. The experimental test results indicated an improvement in energy efficiency of 35% and a loss in cooling capacity of 18%. Multicomponent refrigerant heat pumps can be designed with at least 20% energy improvement and with no loss in cooling capacity.

54143 **(PNL—4763) Massachusetts Home Energy Rating System Project.** Ackerman, A.D.; Cox, M.K.; Schuck, L.J.; Tarini, E.J. (Energyworks, Inc., West Newton, MA (USA)). Aug 1983. Contract AC06-76RL01830. 128p. NTIS, PC A07/MF A01. Order Number DE83017737.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The Massachusetts Home Energy Rating System (HERS) Project aimed to encourage energy efficiency in residential housing by incorporating a rating as part of a utility energy audit is discussed. The rating, on a scale of 0 to 10, supplies information about the overall energy efficiency and an estimated heating cost of a home which can be used by consumers as well as lending and real estate institutions during home purchase or improvement. It is similar to the mileage ratings for automobiles which have proven effective in stimulating consumers to purchase more efficient cars. The problem of insufficient residential energy investment and a possible solution, a home energy rating system, are discussed. The procedure for determining the design criteria for the rating is presented. The technical development of the rating is detailed and field test results are presented. The experience of professional users with the rating and the recommendations for future research are included.

54144 **(PNL-SA—11502) Proposed new energy standard for commercial buildings.** Reilly, R.W. (Pacific Northwest Lab., Richland, WA (USA)). Sep 1983. Contract AC06-76RL01830. 7p. (CONF-830929—8). NTIS, PC A02/MF A01. Order Number DE83018298.

From 8. national passive solar conference; Santa Fe, NM, USA (5 Sep 1983).

A project was established to develop a new energy standard for commercial buildings, using the widely accepted ASHRAE/IES Standard 90A-1980, Energy Conservation in New Building Design, as a starting point and general pattern. Under this project, 90A-1980 was analyzed to determine its effectiveness and to define shortcomings; research was conducted to develop a technical/economic basis for setting improved cost-effective requirements for energy conservation; recommendations were developed for an improved standard; and the recommendations were tested across a suite of 10 building types in 8 climates. Preliminary results from these tests indicate that design compliance with the recommendations provides 15 to 30% annual energy savings in office buildings and smaller but significant savings in other building categories (as compared to buildings designed in compliance with 90A-1980). The recommendations also provide for expanded design freedom in demonstrating compliance, especially compliance with envelope requirements. The recommendations and technical support information were presented to ASHRAE to assist in its periodic upgrading of Standard 90, and to the US Department of Energy as major input to its Congressionally-mandated process of developing minimum design standards for federal buildings and voluntary guidelines for the private sector.

54145 **(PNL-SA—11509) Energy strategy selector for small office building design.** Pansky, S.H.; Holton, J.K. (Pacific Northwest Lab., Richland, WA (USA); Burt-Hill-Kosar-Rittelmann Associates, Washington, DC (USA)). Aug 1983. Contract AC06-76RL01830. 13p. (CONF-830929—7). NTIS, PC A02/MF A01. Order Number DE83017868.

From 8. national passive solar conference; Santa Fe, NM, USA (5 Sep 1983).

Portions are illegible in microfiche products.

A research project has been conducted to develop a simple handbook to encourage the incorporation of cost saving energy conservation strategies into the design of small office buildings. Modeling of base case buildings has been accomplished and a limited set of Energy Problem Types have been defined as typical of the full spread of runs. Representative utility rate profiles have been developed which (along with the EPT's) have guided the selection of energy conservation strategy sets. These strategy sets address the important aspects of the energy cost problem in any particular utility for any base case building. Means to determine representative construction costs and energy cost savings provide the bottom line for strategy selection.

54146 **Perfluorocarbon tracer method for air-infiltration measurements.** Dietz, R.N. US Patent Application 6-422,516. 23 Sep 1982. 11p. Contract AC02-76CH00016.

A method of measuring air infiltration rates suitable for use in rooms of homes and buildings comprises the steps of emitting perfluorocarbons in the room to be measured, sampling the air containing the emitted perfluorocarbons over a period of time, and analyzing the samples at a laboratory or other facility.

54147 **Conservation of energy resources.** Mauss, E.A.; Ullmann, J.E. (eds.). New York, NY; New York Academy of Sciences (1979). 88p. (CONF-7710240—). New York Academy of Sciences, 2 East 63rd Street, New York, NY 10021.

From Workshop/conference on conservation of energy resources; New York, NY, USA (15 Oct 1977).

The following papers are included: Social, Political, and Ethical Choices in Developing Energy Policies by John C. Sawhill; Choices in Developing Energy Choices by Amory B. Lovins; Energy Conservation: Some Technical and Economic Possibilities by Lloyd J. Thomas; Four Anxieties about a Vigorous National Conservation Program by R. H. Socolow; Energy Conservation: The Weight of the Past and the Problems of Persuasion by John E. Ullman; The Energy Value of Our Existing Stock of Buildings by Richard G. Stein; The Role of Energy Conservation in Industry by Eric R. Zausner; The Role of Energy Conservation in Industry: Discussion Paper by Charles A. Berg; End-Use Technology: The Next Twenty-Five Years by George R. Murray and Michael Power; The Department of Energy's End-Use Conservation Program by Marc Ross; and The Politics of Energy Conservation by Daniel Yergin. (MHR)

3202 Transportation

REFER ALSO TO CITATION(S) 54176, 54197

54148 **(AD-A—128532/9) Fuel conservation evaluation of US Army helicopters. Part 5. Ah-1S flight testing. Final report, 31 July-21 September 1982.** Todd, L.L.; Savage, R.T.; Vincent, R.L.; Williams, R.A.; Downs, G.T. (Army Aviation Engineering Flight Activity, Edwards AFB, CA (USA)). Jan 1983. 74p. NTIS, PC A04/MF A01.

The United States Army Aviation Engineering Flight Activity conducted level flight performance tests of the AH-1S (Prod) helicopter to provide data to determine the most fuel efficient operating conditions. Hot and cold weather test sites were used to extend the range of the advancing tip Mach number data to supplement existing AH-1S performance data. Preliminary analysis of non-dimensional data identifies the effects of compressibility on performance and shows a power penalty of as much as 6% at a high NR/theta. The power required characteristics determined by these tests can be combined with engine performance to determine the most fuel efficient operating conditions.

54149 **(BNL—51575) Health impacts of productive conservation in urban transportation. Tapcut technical memorandum No. 27.** Rowe, M.D.; Crowther, M.A. (Brookhaven National Lab., Upton, NY (USA)). Jan 1982. Contract AC02-76CH00016. 78p. NTIS, PC A05/MF A01. Order Number DE83018218.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The literature on health effects of transportation-related pollutants is reviewed and assesses potential health risks of selected energy conservation policies for transportation systems in three representative cities. The conservation policies assessed are specified in other reports. The assessment includes health risks from pollutants emitted by vehicles, from pollutants emitted by industries involved in vehicle manufacturing, and from occupational accidents related

to vehicle manufacturing throughout the economic system. Estimated health risk is dominated by ozone and hydrocarbon (benzo(a)pyrene) exposure. Results indicate that health risks from urban transportation systems will either remain constant or decline between 1980 and 2000 under all policies assessed. No significant change is projected for health risks from toxicants produced in vehicle manufacturing or from risks of occupational accidents throughout the economic system. In general, policies that reduce energy consumption also reduce projected health risks, even when they promote new technologies having potentially significant differences in emission characteristics and manufacturing requirements.

54150 (CONF-8208148—, pp 19-22) **Energy-conservation programs, State Department of Transportation.** Kam, A.L. (State of Hawaii, Dept. of Transportation, Honolulu). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

The Hawaii State Department of Transportation has undertaken various measures to promote energy conservation and transportation efficiency which are highly complementary to the State Energy Plan. Several of its most-successful and innovative endeavors are briefly discussed: the 55-mph speed limit; HOV lanes; car- and van-pool demonstration programs; and the 400-Hertz power system for the Hawaii International Airport which includes an airfield lighting system, a fixed-ramp air system, a potable water system, and a new Interisland Terminal.

54151 (CONF-8208148—, pp 89-92) **Electric-vehicle operations at the Hawaiian Telephone Company.** Fulcher, M. (Hawaiian Telephone Co., Honolulu). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

Since January, 1980 the Hawaiian Telephone Company has operated a fleet of 25 electric-powered vehicles (EV's) for service activities and as general pool cars. The article deals briefly with the history of the program, provides highlights of the operational experience with the EV's, outlines the current status of the operation, and presents the company's views of the near-term future of EV's.

54152 **(PB—83-194829) Comparative analysis study of alternative transit systems - South Hills Corridor. Final report.** (De Leuw, Cather and Co., Chicago, IL (USA)). Nov 1976. 600p. NTIS, PC A25/MF A01.

The objective of this analysis was to furnish sufficient information to enable the appropriate government agencies to reach managerial, operational, and engineering decisions relating to systems, technologies, service characteristics, costs, and other factors, and in so doing, define that system which would best serve the needs of the South Hills Corridor. The analysis involved four modes: a rubber-tired rapid transit system, a steel-wheeled, light-rail transit (LRT) system, a rapid rail transit system, and an express bus transit system. This report concludes that LRT would offer the most cost-effective and financially feasible alternative of those considered and would have sufficient advantages to allow it to be considered the leading candidate system for implementation in the South Hills Corridor.

54153 **(PB—83-221804) Locomotive data acquisition package. Volume 5. Locomotive Analysis Software Package: user's guide. Final report Apr 81-Jan 82.** Hamid, A.; Storch, P.; Scofield, R.; Davis, M. (Ensco, Inc., Springfield, VA (USA)). Mar 1982. 223p. NTIS, PC A10/MF A01.

The Locomotive Data Acquisition Package (LDAP) is a complete data acquisition system designed specifically for use on board railroad locomotives to study locomotive performance while in normal over-the-road operations. It is a semi-portable system requiring only limited installation support commonly found in railroad shops. The system may be applied to study energy conservation measures as well as train dynamics. This volume describes a Locomotive Analysis Software Package consisting of 12 software programs which may be used for data verification, data reduction, and analysis of data collected by the Locomotive Data Acquisition Package. Baseline data is provided to illustrate the use of the analytical software which has been developed. While the programming has been developed for use on a DEC PDP-11 computer the language and format is suited to use on other computer systems.

54154 **(PB—83-221812) LASP: Locomotive Analysis Software Package. Software.** Bang, A. (Federal Railroad Administration, Washington, DC (USA). Office of Research and Development). Mar 1982. vp, mag tapep. Source tape is in ASCII character set. Character set restricts preparation to 9 track, one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products if you have questions. Price includes documentation, PB83-221804.

The tape contains Locomotive Analysis Software Package for analyzing the data collected by a Locomotive Data Acquisition Package (LDAP). The LDAP is designed to study the locomotive performance and may be applied to study the energy conservation measures as well as train dynamics. The locomotive analysis software package consists of 12 computer programs which, along with the subroutines, reside on 31 files on the tape. These programs may be used for data verification, data reduction and analysis of data collected by LDAP. While the programs have been developed for use on a DEC PDP 11/70 computer, the language and format is suitable for use on other computer systems...Software Description: The system is written in the FORTRAN programming language for implementation on a DEC PDP 11/70 computer using the IAS version 3.1 operating system. The computer memory requirement is 64K.

54155 **(PB—83-232959) Surface characteristics of roads resurfaced using the repave process. Final report.** Cooper, D.R.C.; Young, J.C. (Transport and Road Research Lab., Crowthorne (UK)). [nd]. 25p. (TRRL-SUPPLEMENTARY—744). NTIS, PC E03/MF E01.

The repave process permits substantial economies to be made by recycling in situ part or all of the existing surface material. Inlay and overlay repaving requires only 15 or 20mm of new material compared with conventional resurfacing requiring removal and replacement of the full depth of wearing course. The technique involves heating and scarifying with addition of new materials prior to rolling, and the process is completed in a single pass, with reduced disruption to traffic. Measurement of longitudinal profile, riding quality and surface texture are discussed and related to the overall quality of surface finish achieved by the process. Measurements were made at 11 sites on motorways and trunk roads. Total length examined was 51km, and repairing was done using a modified Cutler machine, a Wirtgen machine, and conventional methods. At four sites, conventional replacement of the hot-rolled asphalt and repaving were carried out. Overall, repaving resulted in a riding surface comparable with conventional methods, although a variable finish affects the ride, particularly at lower speeds.

3203 Industry And Agriculture

REFER ALSO TO CITATION(S) 53387, 53446, 54065, 54147, 54155, 54185

54156 **(AD-A—125159/4) Boiler control systems oxygen trim systems manual. Final report fy 82.** (Ultrasystems, Inc., Irvine, CA (USA)). Feb 1983. 67p. NTIS, PC A04/MF A01.

The Oxygen Trim Systems Manual is intended to serve as a guide for boiler operating personnel in understanding the concepts and principles which govern combustion air trim systems and their application to industrial boiler combustion control for the purpose of increasing the boiler efficiency. The Oxygen Trim Systems Manual also serves to familiarize the boiler operating personnel with the various trim systems that are commercially available, using different constituents of the flue gas as a control parameter. The manual is generally confined to oil and gas-fired heating boilers in the 60 million BTU per hour capacity range, but many of the concepts and principles discussed are applicable to boilers of any size. Combustion air trim systems employing carbon dioxide, oxygen, and carbon monoxide as a control parameter, singly or in combination, are covered. Smoke prevention and control is also discussed. Section 2.0 is devoted to terminology and definitions of technical and non-technical terms peculiar to combustion control, with which

the user might not be familiar. This was done so that the manual be self-contained to the extent practicable.

54157 **(AD-A—128764/8) Parametric examination of the heat recovery incinerators at NAS (Naval Air Station), Jacksonville. Report for Oct 81-Sep 82.** Kodres, C.A. (Naval Civil Engineering Lab., Port Hueneme, CA (USA)). Mar 1983. 63p. (NCEL-TN—1659). NTIS, PC A04/MF A01.

A mathematical model is developed to simulate the operation of the heat recovery incinerators at NAS Jacksonville. The model is used to conduct a parametric examination of the facility. Airflows, including leakages, are the dominant parameters affecting operation of the HRI. Because of poor airflow control, and partly because of air leakage, the Jacksonville HRIs rarely operate in the starved air mode they were designed for.

54158 **(AD-P—000794/8) Energy recovery from pretreatment of industrial wastes in the anaerobic fluidized bed process.** Li, A.; Sutton, P.M.; Corrado, J.J. (Dorr-Oliver, Inc., Stamford, CT (USA)). 1982. 21p. NTIS, PC A02/MF A01.

The conclusions derived from the results presented in this paper include the following: (1) High strength industrial wastewaters, such as whey permeate, can be effectively treated by the anaerobic fluidized bed process and the energy generated, recovered. COD and BOD5 removals of over 80% can be obtained at volumetric loading rates over 24 kg COD/cu m 3 -day (1.5 lb COD/sq ft 3 -day). The observed methane production will be approximately 0.3 cu m 3/kg COD at STP. (2) Parallel operation of two Anitron System reactors at two different levels of feed concentration revealed that there appears to exist a maximum system hydraulic retention time beyond which microbial solids begin to proliferate in the liquid phase of the system. In the treatment of whey permeate at a volumetric loading rate of 16 kg COD/cu m 3 -day, the maximum system HRT corresponds to a maximum system HRT corresponds to a maximum feed COD concentration of approximately 15,000 mg/1. (3) Results to date indicate the superior performance of the two-phase operation over the single phase system at a volumetric loading of 10 kg COD/m3 -day. Studies are under way to evaluate the two-phase performance at higher loading rates.

54159 **(ANL/CNSV—41) Energy and materials flows in the iron and steel industry.** Sparrow, F.T. (Purdue Univ., Indianapolis, IN (USA)). Jun 1983. Contract W-31-109-ENG-38. 115p. NTIS, PC A06/MF A01. Order Number DE83017530.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Past energy-consumption trends and future energy-conservation opportunities are investigated for the nation's iron and steel industry. It is estimated that, in 1980, the industry directly consumed approximately 2.46 x 10^{15} Btu of energy (roughly 3% of total US energy consumption) to produce 111 million tons of raw steel and to ship 84 million tons of steel products. Direct plus indirect consumption is estimated to be about 3.1 x 10^{15} Btu. Of the set of conservation technologies identified, most are judged to be ready for commercialization if and when the industry's capital formation and profitability problems are solved and the gradual predicted increase in energy prices reduces the payback periods to acceptable levels.

54160 **(DOE/CS/40341—T2) Evaluation of hydropyrolysis as an energy-saving alternative to the Tomlinson furnace. Task III. Chemical causes of increased pulp yield.** (Saint Regis Paper Co., Pensacola, FL (USA). Technical Operations Div.). 1977. Contract AC05-80CS40341. 15p. NTIS, PC A02/MF A01. Order Number DE83017878.

The yield-enhancing effect was found to be the result of the presence of small but significant levels of polysulfide and calcium ions. Polysulfide ions are generated during the causticization of the hydropyrolysis filtrate and is the result of a partial-air oxidation of Na_2S that occurs under conditions existing during the causticizing process. In the presence of residual organics, calcium ions are complexed to form soluble calcium-organo complexes which allow for a carryover of a significant amount of calcium into the final cooking liquor. The presence of both ions in the final cooking liquor allow for pulp yield increases through the formation of alkali-stable aldonic acid end-groups which protect carbohydrates from alkaline-degradation.

54161 **(DOE/CS/40341—T3) Evaluation of hydropyrolysis as an energy-saving alternative to the Tomlinson furnace. Task II. Chemistry of hydropyrolysis.** (Saint Regis Paper Co., Pensacola, FL (USA). Technical Operations Div.). 1981. Contract AC05-80CS40341. 50p. NTIS, PC A03/MF A01. Order Number DE83017879.

Studies were conducted of reactions involving model compounds of black liquor and reaction products when reacting black liquor at extreme conditions for the purpose of understanding the chemistry occurring in hydropyrolysis. Reaction studies of model compounds included: lignin precipitated from black liquor, the sodium salt of saccharinic acid, sodium lactate, sodium glycolate, sodium oxalate, sodium acetate and sodium formate.

54162 **(DOE/CS/40402—16) Assessment of energy-efficiency improvements for paint spray booths.** (Centec Corp., Reston, VA (USA)). Mar 1983. Contract AC01-80CS40402. 73p. NTIS, PC A04/MF A01. Order Number DE83016680.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The purpose of this report is to inform industry and industrial associations of the economic and technical benefits achievable through spray booth control. A discussion of the energy use and potential for conservation in spray booths is presented. Descriptions, costs, and payback potentials of several spray booth control system concepts are provided. In addition, the technological barriers and the R and D needs to overcome these barriers are identified and discussed.

54163 **(DOE/SF/10842—T1) Validation of the Cumberland Energyplex concept. Volume 3. Appendixes. Final report.** Barkhordar, P.M.; Crooks, G.; Martin, P.J. (SRI International, Menlo Park, CA (USA)). Jun 1979. Contract AT03-80SF10842. 54p. NTIS, PC A04/MF A01. Order Number DE83017432.

This volume contains brief appendixes of three types: (1) some topics, although their analyses were not directly requested in the contract work statement, are examined because they are central to determining the validity of the Energyplex concept (e.g., socio-economic effects and anaerobic digestion of animal wastes to recovery energy). (2) Methane from Illinois coal beds is discussed as a potential energy resource; however detailed analysis has been prevented by the paucity of necessary geological data. (3) Those Energyplex elements whose brief examination revealed some barrier are noted. For example, recovering energy from the relatively small amount of municipal waste generated by Charleston and Mattoon shows no economic promise, and cement production in the southeast quadrant of Illinois appears to be limited by inadequate quantities of limestone of the proper quality.

54164 **(DOE/SF/10842—T2) Validation of the Cumberland Energyplex concept. Volumes 1 and 2. Executive summary and analysis detail. Final report.** Barkhordar, P.M.; Chatterjee, A.K.; Clark, C.F.; Crooks, G.; Dore, J.S.; Martin, P.J.; Pierce, S.R. (SRI International, Menlo Park, CA (USA)). Jun 1979. Contract AT03-80SF10842. 192p. NTIS, PC A09/MF A01. Order Number DE83017469.

Portions are illegible in microfiche products.

The definition and goal of the Energyplex, available and required resources, Energyplex elements and their economics, Energyplex products and markets, environmental residuals, electricity in Illinois, and have the goals are met are included. Elements of the Energyplex described are: ammonia from coal, synthetic natural gas plant, coal liquefaction, enhanced oil recovery, use of reject heat from power generation units, greenhouse environmental control, aquaculture, livestock enclosures, and corn refining and soybean oil and meal production. (MHR)

54165 **(ERATL—83/15) Benefits to industry of improved efficiency motors. Final report.** Knights, D.E. (ERA Technology Ltd., Leatherhead (UK)). Aug 1980. 226p. (ERA—80-8). NTIS $760.00.

The report considers the effects on industry of utilizing a.c. motors with operating efficiences superior to those presently available from the manufacturers' standard range of motors. The report

includes a survey of the current trends in the design of improved efficiency motors in Europe and America, and investigates what improvements in efficiency and power factor are possible from conventional motor designs. Advice is also given on the benefits of improved efficiency motors and their efficient use in industry. A survey of the criteria used for selecting motors and the future requirements of motor users is also included.

54166 **(NP—3770397) Closing-down greenhouses in times of high energy demand.** Tantau, H.J.; Luer, E. (Hannover Univ. (Germany, F.R.). Inst. fuer Technik in Gartenbau und Landwirtschaft). 1982. 109p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83770397.

Portions are illegible in microfiche products.

Closing-down greenhouses in winter time is a widespread reaction of horticultural enterprises to the energy price risings of the recent years. Such closing must be carried out diligently in order to prevent damage through weather conditions to the greenhouse heating system and the rest of the interior equipment so that their service life is not reduced. The heating system specially determines the technical possibilities of closing a greenhouse. Planning of new greenhouses which will be closed during the winter needs careful design of construction and heating system according to these special demands. The question of whether to close a greenhouse or not strongly depends on the situation of the enterprise concerned, especially technical and economical conditions. To facilitate the decision a list of costs which can be caused by a closing-down was set up in this book as well as the possible energy saving depending on the length of the planned closing time and the planned temperature inside the greenhouse.

54167 **(NP—3770409) Heat pumps - technology, economy, selection, installation.** (Hessisches Ministerium fuer Wirtschaft und Technik, Wiesbaden (Germany, F.R.)). 1983. 235p. (In German). NTIS (US Sales Only), PC A11/MF A01. Order Number DE83770409.

Portions are illegible in microfiche products; Loose-leaf collection.

This documentation on the heat-pump exhibition gives information on function, heat sources and operation of heat pumps in the section "Technology", examples of installed heat pump systems are given in the section "Economy", "Selection" deals with heat demand calculations, dimensioning and control of heat-pump heating systems, "Installation" reports on the usage and installation of heat pumps.

54168 **(PB—83-158444) Technical review, volume 19, number 3, serial number 55, October 1982 (Mitsubishi Heavy Industries).** (Mitsubishi Heavy Industries Ltd., Tokyo (Japan)). [nd]. 109p. NTIS, PC A06/MF A01.

Contents: Transportation of 330 t/h steam generator module for Medina and Yanbu Power and Desalination Plant of the Kingdom of Saudi Arabia; Changes of material properties and maintenance of pressure parts of thermal power plant boilers under long term service; Changes of material properties and life management of steam turbine components under long term service; Development of Mitsubishi Intermittent Energization System (MIE) for electrostatic precipitators for coal fired boilers; Fuel saving type power plant for automobiles (illustration); MITSUBISHI TREDIA and CORDIA (illustration); Mitsubishi new speciality sports car 'STARION' (illustration); Hydrodynamic performance of various devices for the improvement of propulsive performance of ships; A method for estimating the strength of ship hulls against sloshing load; A study on upgrading of low-grade coals by heat treatment; High efficiency super-critical 500-MW steam turbine; Development of Mitsubishi high performance MW-701D gas turbine (120 MW class); Mitsubishi-Iwata paint coating robot; Yodogawa Ohzeki long span gate; MITSUBISHI LANCER-F; MITSUBISHI COLT 1400 with turbo-charger; MITSUBISHI 'PAJERO' new multi-purpose 4-wheel drive vehicle--outline of the general export model--; Development of injection molding machine for precision molding, 350 MF-40P; Paint coating robot technology.

54169 **(PB—83-164517) Use of recording watt/varmeter to evaluate the electrical power requirements of a combination edger. General technical report (final).** Adams, E.L. (Forest Service, Broomall, PA (USA). Northeastern Forest Experiment Station). 1983. 9p. NTIS, PC A02/MF A01.

A variety of uses can be made of the data provided by a recording watt/varmeter. One was used to measure power consumed by a combination edger processing red oak material--cants gangsawed on one side of the edger and boards edged on the other. Log sizes processed through the headrig and sizes of material processed through the edger were also recorded.

54170 **(PB—83-170191) Design, construction and testing of a gas engine driven high temperature industrial heat pump. Final report.** Kew, P.A. (Commission of the European Communities, Luxembourg). [nd]. 65p. NTIS, PC E04/MF E04.

The Phase I design study recommended that a nominal 75 kW drive heat pump using a reciprocating spark ignition gas engine and a wet reciprocating compressor should be built to give a thermal output of 356 kW with an evaporating temperature of 60C and a condensing temperature of 120C when removing heat from a water source at 80C and delivering saturated steam at 110C. R114 was the chosen working fluid. The detailed design of Phase II included the refrigerant, water and steam pipework and a control system suitable for automatic shutdown.

54171 **(PB—83-180547) Industrial and commercial cogeneration.** (Office of Technology Assessment (U.S. Congress), Washington, DC). 1982. 303p. NTIS, PC A14/MF A01.

The report describes the available and promising future cogeneration technologies, including their likely costs and operating characteristics, and reviews the potential applications for these technologies in industry, commercial buildings, and rural/agricultural areas. It also describes the technical requirements for interconnecting cogeneration systems with the utility grid, and discusses advanced combustion and conversion technologies (fluidized bed and gasification systems) that will enable cogenerators to use fuels other than oil and natural gas. The analysis of cogeneration's market potential focuses on the competitiveness of cogeneration when compared to investments in conservation or in conventional separate thermal and electric energy systems (e.g., an industrial boiler and a central station utility powerplant). In addition, the report examines the possible effects of the widespread use of cogeneration systems on utilities and their ratepayers, and on air quality. Several options for changes in Federal policy in order to enhance cogeneration's market potential, to optimize its ability to displace oil and natural gas, and to mitigate its possible adverse economic and environmental impacts are discussed.

54172 **(PB—83-197707) Characterization and processing of coal fired copper reverberatory flue dusts. Open file report 1 October 80-30 September 82.** Raghavan, S.; Ette, A. (Arizona Univ., Tucson (USA). Dept. of Metallurgical Engineering). 25 Apr 1983. 57p. NTIS, PC A04/MF A01.

A detailed study of the physical and chemical characteristics of a flue dust sample from a coal-fired copper reverberatory furnace was carried out. The studies revealed that the majority of the copper in the flue dust is strongly associated with iron in the form of a cuprous ferrite, CuFeO2. The flue dust has an extremely fine size distribution with 70% of the particles below 37 micrometers in size. The recovery of copper from the flue dust was investigated using an ammoniacal carbonate solution. The results indicate that a reductive roast prior to leaching is necessary to obtain high extractions. In order to better understand the leaching characteristic of the flue dust, attempts were made to synthesize and study the leaching of the main copper bearing constituent, CuFeO2 (delafossite). The dissolution of delafossite was found to depend on the extent of reduction, particle size, and stirring speed. A film diffusion model was proposed to describe the kinetics of leaching of delafossite.

54173 **(PB—83-232199) Reduction of energy needs for fish harvesting through the use of sails on fishing vessels.** (Rebel Marine Service, Inc., Norfolk, VA (USA)). 10 May 1983. 40p. NTIS, PC A03/MF A01.

The fishing industry has been hurt by rising fuel costs. This study was undertaken to determine the fuel savings that might occur if sails were used on fishing vessels as an auxiliary means of propulsion. Attention was also paid to vessel safety, crew efficiency and 'come-home' capabilities as they were effected by the use of sails. A boat was designed, built and equipped for sail assisted fishing operations. Data was collected during sea trials, test runs and actual fishing operations. These data were analysed with the help of the Virginia Institute of Marine Science to determine the fuel savings and the economic viability of the configuration. Assessment of the observations of crew performance and vessel safety were analyzed.

54174 **(PNL—4803) State-of-the-art of furnace recuperation in the primary metals industry: technical briefing report.** Moore, N.L. (Pacific Northwest Lab., Richland, WA (USA)). Aug 1983. Contract AC06-76RL01830. 116p. NTIS, PC A06/MF A01. Order Number DE83018220.

Existing and emerging recuperator technology is identified, as well as the technical and economic issues in applying such technology. An overview of recuperation and its relevance to the primary metals industry is presented. Design considerations, equipment, and energy and cost savings of five recuperator applications in the primary metals industry are examined. Three applications include a case history of a recent recuperator installation. A cost engineering analysis of recuperator technology is included to ensure that technically feasible engineering projects are also economically attractive business ventures. An overview of emerging recuperation technology is presented.

54175 **(PNL-SA—11354) Innovative industrial-materials processes.** Hane, G.J.; Hauser, S.G.; Williams, T.A. (Pacific Northwest Lab., Richland, WA (USA)). Aug 1983. Contract AC06-76RL01830. 32p. (CONF-830812—45). NTIS, PC A02/MF A01. Order Number DE83016784.

From 18. intersociety energy conversion engineering conference; Orlando, FL, USA (21 Aug 1983).

A preliminary identification of innovative industrial-materials processes that have the potential for significant energy conservation, yet require long-term research to achieve that potential is described. Potential alternative processes in eight major materials-processing industries are reviewed. These industries are chemical; iron and steel; aluminum; petroleum refining; paper and pulp; food and kindred products; stone, clay, and glass; and textiles.

54176 **Energy and other resource conservation within urbanizing areas.** Rowe, P.G. (Rice Univ., Houston, TX). *Environmental Management;* **6**: No. 3, 231-240(May 1982).

Within the bounds of economic feasibility and development practicality, it was found that application of energy-conserving methods in urban areas could yield annual energy savings of as much as 23%, and reduce dependence on prime fuels by 30%. Adverse economic effects on consumers were found to be minimal and environmental quality could be sustained. The major institutional constraints appeared to be those associated with traditional property ownership and with the use of common property resources. The resistance to change of everyday practices in land development and building industries also seemed to constrain potential applications.

3206 Municipalities And Community Systems

REFER ALSO TO CITATION(S) 54083, 54092, 54171, 54176

54177 (CONF-8208148—, pp 35-38) **Energy-conservation programs: Kauai County.** Blanchard, W. (Dept. of Economic Development, Lihue, HI). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

The efforts made in Kauai County, Hawaii, the most remote in the Hawaiian chain of islands, to make better use of alternate energy sources and to conserve existing energy are discussed. A complete energy audit was made to determine where conservation efforts would be most effective. As a result of the evaluation, the use of electrical power for street lighting and the use of liquid fuel for County vehicles have been two major sources of energy conservation. Miscellaneous other conservation efforts are also briefly discussed.

54178 (CONF-8208148—, pp 39-40) **Energy-conservation programs: County of Hawaii.** Kearns, H.S. Jr. (Dept. of Research and Development, Hilo, HI). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

Several of the points are presented from a 1980 energy study done by the County of Hawaii to better focus their energy-conservation efforts. Two changes implemented by the Department of Water Supply (DWS) and the Department of Public Works (DPW) are considered to be especially significant: at one DWS station, the water flow between a mountain and lower-level reservoir was used to generate electricity that not only saves that particular station the $7800 annual electric bill it was paying, but also earns $3000 of electricity a year by selling power back to the utility. The DPW has changed from mercury-vapor and incandescent to low-pressure sodium lamps which translates into a potential monthly savings of 235,000 kWh or $25,000. Other conservation opportunities in Hawaii County include those in the areas of Administration, the Department of Parks and Recreation, and the Police Department.

54179 (CONF-8208148—, pp 44-47) **Energy-conservation programs: Building Dept., Building Dept., City and County of Honolulu.** Morikawa, C.Y. (City and County of Honolulu, Hawaii). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

To help control the ever-increasing cost of electricity, the city and county of Honolulu developed a City Energy Conservation Plan which states City Energy Program goals and objectives, describes the organizational structure and responsibilities, and lists program areas. The City Energy Conservation Committee was also formed to expedite the implementation of energy-saving measures and provide the necessary liaison services between City departments to achieve a successful program. Some of the quick-fix actions taken are enumerated and the more cost-intensive projects planned for the future are mentioned. So far the energy-conservation measures have proved to be successful judging from the 11% drop in kWh's in one year, which manifests itself as a savings of $170,000.

54180 **(DOE/BP—166-Vol.1) Industrial-electricity-conservation potential in the Pacific Northwest. Volume I. Final report.** Lang, K.; Hinkle, B.K. (Synergic Resources Corp., Bala-Cynwyd, PA (USA)). Mar 1983. 143p. NTIS, PC A07/MF A01. Order Number DE83017727.

Portions are illegible in microfiche products.

The findings of an update of the assessment of industrial electricity conservation potential in the Pacific Northwest (PNW) completed in February 1982 are presented. Using a detailed process energy end use data base developed by SRC in an earlier study for BPA, conservation measures were identified for nine 4-digit SIC (Standard Industrial Classification) industries, representing the most energy intensive industries in each of the major industry groups in the PNW, in the February 1982 report. Assumptions associated with these measures were revised in response to comments from industry representatives in the PNW. An engineering-economic analysis was performed for each conservation measure. Based on the economic attractiveness of the measure relative to average hurdle rates (which are equivalent to the cost of equity) in each industry, estimates of the economic potential of each conservation measure were made. A market penetration model was then used to estimate the actual implementation of each measure over time. The conservation potential estimated for the 4-digit industries was extrapolated to the 2-digit level using an analysis of the end uses of electricity and a baseline forecast of industrial electricity requirements provided by BPA. Options for BPA and utility programs to encourage industrial electricity conservaton were identified and their costs and benefits were estimated.

54181 **(DOE/BP—166-Vol.2) Industrial electricity conservation potential in the Pacific Northwest. Final report. Volume II. Appendices.** Lang, K.; Hinkle, B.K. (Synergic Resources Corp., Bala-Cynwyd, PA (USA)). Mar 1983. 191p. NTIS MF A01. Order Number DE83017728.

Microfiche only, copy does not permit paper copy reproduction. Original copy available until stock is exhausted.

The following appendices are included: characteristics of Typical Plants Evaluated for Electricity Conservation potential; Applications of Conservation Measures to Typical Plants of Nine Four-Digit Industries; Review of Market Penetration Models; Tables of Electricity Savings of Program Options by Industry, Year, and Price Trajectory; Response to Industry Comments. (MHR)

54182 **(DOE/CE/15126—T2) Evaluation and test program of a 50-ton-per-day Lantz converter. Second quarterly technical progress report.** (Lantz America, New York). Apr 1983. Contract FG01-82CE15126. 28p. NTIS MF A01. Order Number DE83017702.

Microfiche only, copy does not permit paper copy reproduction.

The evaluation and test program of a 50-ton-per-day Lantz converter pyrolysis process for producing pyrolytic gas from municipal solid waste was begun in September 1982 at the Marcal Paper Mills plant in Elmwood Park, New Jersey. The Lantz converter, the drier, shredder, moving floor, conveyer, char ram, boiler and other auxiliary equipment were installed and tested by the Lantz America group in a specially constructed building on the Marcal site. During the past three months the plant has been run almost every day, originally using waste paper as the feed stock and then switching to municipal solid waste. Some unexpected technical difficulties were encountered especially with the control system of the Cleaver Brooks boiler and as of this date all of the steam produced in the boiler has just been vented to the atmosphere. Thus the overall operation of the plant is still being debugged and the plant has not been run for periods of more than a few hours at a time. Hopefully a series of sustained, long time runs will be initiated next month so that both meaningful test data can be taken and the steam produced from the pyrolytic gas can be sold to Marcal.

54183 **(DOE/CE/15126—T3) Evaluation and test program of a 50-ton-per-day Lantz converter. Third quarterly technical progress report.** (Lantz America, New York). Jul 1983. Contract FG01-82CE15126. 27p. NTIS MF A01. Order Number DE83017795.

Microfiche only, copy does not permit paper copy reproduction.

The evaluation and test program of a 50-ton-per-day Lantz converter pyrolysis process for producing pyrolytic gas from municipal solid waste was begun in September 1982 at the Marcal Paper Mills plant in Elmwood Park, New Jersey. The program consists of specifying and implementing the complete instrumentation and control of the plant, running experiments under different operating conditions, obtaining laboratory analyses of the refuse used, of the pyrolytic gas and char produced, and of the stack gas vented to the atmosphere, processing and evaluating data, implementing modifications as suggested by the tests and finally optimizing the process. Work has been focused in two different areas: continuation of the development of the computer programs and subroutines necessary for communication between the Burr Brown front end and the Lab Tech 70 computer described previously with the overall goal of completely controlling the operating conditions of the plant by computer, and simulation of the Lantz converter pyrolysis plant by performing relatively simple bench scale laboratory pyrolysis experiments in order to obtain an estimate of the efficiency of the Lantz America process.

54184 **(DOE/CS/20192—T3) Influence of corporate strategy on the decision to proceed with district heating: case study of Toledo Edison Company.** (Resource Planning Associates, Inc., Cambridge, MA (USA)). 18 Dec 1981. Contract AC01-79CS20192. 119p. NTIS, PC A06/MF A01. Order Number DE83018237.

Portions are illegible in microfiche products.

The following are included: the Influence of Corporate Strategy on the Decision to Proceed with District Heating - a Case Study of Toledo Edison Company; Reviews of Prospects of European Coal Exports; Market Survey of Water-Source Heat Pumps Manufacturers and Distributors; and Memoranda on Review of Activities: Market-Related Research for Community Systems and National Strategy for District Heating. The Case Study of Toledo Edison includes the following: alternatives district heating schemes considered and scenarios affecting Toledo Edison's decision. (MHR)

54185 **(DOE/CS/24312—7) Analysis of the financial impacts to the industrial energy user of using coal or municipal solid waste in a new process-steam-generating plant.** (CSI Resource Systems, Inc., Washington, DC (USA)). Oct 1983. Contract AC01-80CS24312. 111p. NTIS, PC A06/MF A01. Order Number DE83017996.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

An analysis is presented of the financial impacts to the industrial energy user of using either coal or MSW in a new process-steam-generating plant. The results of the analysis indicate that the use of coal or solid waste, rather than oil, in a new energy production plant represents an attractive investment. The financial analysis is based on replacing an existing oil-fired plant with a new plant financed via 100-percent debt. The analysis was structured to cover a range of steam demands, different plant ownership and operating structures, and the tax benefits available to these types of plants. Information is also provided on the types of technologies that would be appropriate given the assumed steam demands. In addition, information is provided on available tax benefits in light of recent tax law changes. Nine options for new coal and MSW plants were analyzed, reflecting a matching of technology and energy output to various process steam demands, as well as different ownership and operating structures.

54186 **(DOE/CS/24355—T1) Cogeneration project - Clark University. Integrated Community Energy System.** Stockwell, F.D. (Clark Univ., Worcester, MA (USA)). May 1983. Contract AC02-80CS24355. 14p. NTIS, PC A02/MF A01. Order Number DE83017551.

The history of this project is traced briefly from the first idea to the diesel plant shutdown because of the rising fuel cost and small sellback rate for electricity. Also included are: a chronology, list of contractors, electrical and heat considerations, start-up problems and changes, and gas and fuel costs. (MHR)

54187 **(PB—83-167783) Cogeneration and utility planning. Final report.** Pickel, F.H. (Massachusetts Inst. of Tech., Cambridge (USA). Energy Lab.). Jul 1982. 337p. NTIS, PC A15/MF A01.

The report refines methods for forecasting customer cogeneration to assist electric utility planning for power supply and tariff design. The study employs a physically-based, or engineering-economic process, approach to cogeneration forecasting that accounts for both cogeneration investment and operating choices by the utility's customers. This approach reflects the long-term uncertainties in the fuel and electric prices affecting those customer choices and the short-run uncertainties influencing cogeneration plant performance. The analysis devotes special attention to the effect of utility tariffs on the customer's decision to build and operate a cogeneration plant and the resulting impact of these plant investment and operating choices by the customer on the utility.

54188 **(PB—83-197822) How to run a community recycling center: a resource guide to low-technology recycling in Illinois.** Engelhardt, A.L. (North Shore Ecology Center, Glencoe, IL (USA)). Aug 1982. 187p. NTIS, PC A09/MF A01.

In the pages of this guide, the reader will find an array of management options for recycling centers, techniques for marketing and handling recyclables, and suggestions for making a recycling project competitive and successful. Also readers will find solid information about the most common methods used by community-based recycling organizations in Illinois, advise on possible pitfalls

and suggest additional resources for aid in developing recycling programs.

54189 **(PB—83-229781) A. D. C. F. analysis of a Totem based district heating scheme.** Andrews, D.C.; Lowe, R.J. (Open Univ., Milton Keynes (UK). Energy Research Group). Aug 1981. 45p. NTIS, PC E04/MF E04.

Four Fiat Totems, comprising modified Fiat 127-703 car engines fueled by gas or alcohol combined with 2 back-up gas boilers, were used to provide space heating and hot water for an estate of 50 well insulated, terraced and back-to-back houses. A detailed design and costing of the Totem system was carried out and comparisons made with a conventional system based on individual gas boilers. Discounted cash flow analysis was used to assess the value of the investment required for the Totem system using a variety of assumptions for discount rate, fuel price inflation, and electricity capacity credits.

54190 **District-heating handbook. Volume 1. A design guide.** Washington, DC; International District Heating Association (1983). 520p. (DOE/NBM—3018252). International District Heating Association, 1735 Eye St., N.W., Washington, DC 20006. Contract W-31-109-ENG-38.

An overview and listing of district heating and cooling are presented. Other topics include: overall system considerations, sources of energy for district heating systems, steam and hot water production plant, air conditioning, distribution systems, metering, district heating service to the user, and the economic and financial analysis of community energy systems. (MHR)

3209 Education And Public Relations

REFER ALSO TO CITATION(S) 54054

54191 (CONF-8208148—, pp 41-43) **Energy-conservation programs: County of Maui.** Miyazono, F. (Energy Extension Service, Office, Wailuku). 1982. NTIS, PC A13/MF A01.

From Governor's energy conference - Hawaii's energy options for the 80's; Honolulu, HI, USA (15 Aug 1982).

This county in Hawaii has chosen to place a heavy emphasis on consumer education in an effort to promote energy conservation. In-school programs and adult-education courses are aimed at showing residents the ways to implement solar power in their homes. The Energy Extension Service Office (ESSO) provides energy-related services to both residential and commercial sectors including resource center services which have served approximately 1500 residents to date.

54192 **(DOE/CA/10015—T1) Energy for Illinois. Final report.** (Sangamon State Univ., Springfield, IL (USA)). 22 Nov 1982. Contract FG01-81CA10015. 128p. NTIS, PC A07/MF A01. Order Number DE83017354.

Portions are illegible in microfiche products.

Illinois Issues magazine, in November 1982, completed publication of its 19-part energy series, funded by the US Department of Energy as Energy for Illinois. Included is the final financial report on the project, Letters to the Editor commenting on the series, copies of all 19 articles (which appeared from August, 1980 to October, 1982), and a copy of the Washington Monthly national award for political reporting awarded to Illinois Issues and author William Lambrecht for his July, 1981 article, The Illinois Commerce Commission: Rates, Revenues and Reason. These articles cover such subjects as: energy conservation, biomass, cogeneration, bicycling, synthetic fuels from coal, transportation systems and government intervention, building energy performance standards, energy efficient buildings, energy use in Illinois, solar energy, ethanol, nuclear power regulation, and nuclear waste disposal.

54193 **(DOE/IR/10430—T1) Volunteers for Energy Conservation. Final report.** (Los Angeles, City of, CA (USA)). 16 Apr 1981. Contract FG01-80IR10430. 17p. NTIS, PC A02/MF A01. Order Number DE83017846.

Portions are illegible in microfiche products.

The main goal of the program was to utilize volunteers to supply energy conservation information to residents of the City of Los Angeles, primarily low-moderate income, handicapped and senior citizens. The objective was to reach 1000 homes and have nine (9) group workshops, as well as provide support to other energy conservation programs. All goals were reached. Volunteers were trained by staff and energy consultants to provide a home energy survey. This is a survey in which the volunteer goes into a residence and examines their energy usage and suggests ways to conserve. The volunteers also had information on tax credits, low-interest loans, weatherization programs and other available programs. (See attached FN No. 21). Materials were left with the residents that provided the following information: how to read your meter; ways to save energy, both gas and electric; use of a water bag which was provided; and other information dependent on the clients' needs.

33 ADVANCED AUTOMOTIVE PROPULSION SYSTEMS

3301 Internal Combustion Engines

54194 **(AD-A—127239/2) Evaluation of four lubricants using a modified Federal Test Method 354 test procedure. Interim report August 80-December 80.** Montemayor, A.F.; Owens, E.C.; Lestz, S.J. (Southwest Research Inst., San Antonio, TX (USA). Army Fuels and Lubricants Research Lab.). Dec 1981. 141p. (AFLRL—122). NTIS, PC A07/MF A01.

Four 100-hour engine tests were conducted using the Detroit Diesel 6V-53T engine. Federal Test Method 354 was utilized for these tests with the cast iron block version fo the 6V-53T engine used instead of the aluminum block version. Test lubricants were AL-8925-L, AL-9841-L, AL-10153-L, and AL-8980-L, designated as Oils A, B, C, and D in the report.

54195 **(AD-A—128408/2) Review and assessment of reduced emissions/clean burning diesel engines for integration into the Army inventory. Final technical report.** Daugherty, J.M.; Leimert, R.A.; Murchland, P.J.; Nagel, D.M.; Sievers, R.H. (Science Applications, Inc., McLean, VA (USA)). 12 May 1983. 265p. (SAI—84-170-WA). NTIS, PC A12/MF A01.

This effort examines the availability of diesel engines having reduced emission/clean burning characteristics for potential trial in 4000 lb. capacity forklift trucks to be used in closed and semi-closed environments. The effort includes identification of substances which have been identified in diesel engine exhausts, health and safety considerations relating to those substances as established or recommended by U.S. and foreign governmental and professional agencies, and ranges of concentration of the substances which have been noted. Twenty-nine diesel engines which might be suited for use in 4000 (and 6000) lb. forklift trucks are characterized by manufacture-provided descriptive information and test data. A ranking scheme based on exhaust emissions and other parameters over a standardized work cycle was developed and applied to identify the candidate engines which appear most promising for the Army's application and, thereby, most appropriate for further testing. Analysis of the data did not identify a candidate engine suitable for use in a closed environment without precautions or limitations for human exposure. These questions are to be subjects of further analysis and empirical testing.

54196 **(AD-A—128422/3) Shakedown and preliminary calibration tests for the fuel engine evaluation system using the Km914A Sachs Rotary Combustion Engine. Technical note.** Webster, G.D.; Cote, P.; McMahon, R.J. (Defence Research Establishment, Ottawa, Ontario (Canada)). Dec 1981. 47p. (DREO-TN—81-19). NTIS, PC A03/MF A01.

A Fuel Engine Evaluation System (FEES) has been designed to evaluate the effects of changes in fuel composition on engine performance and operability. This report describes FEES and the tests carried out to calibrate the system and to determine its reliability. From the results obtained recommendations are made to improve the system. FEES was designed to handle spark ignition and compression ignition research engines of power output up to 22

kW at 3500 RPM. Cold start capability testing to -40 C is also available. The engine used for the above tests was a Sachs, single rotor KM914A rotary combustion, spark ignition engine.

54197 **(AD-A—128658/2) Effect of volatility on air-fuel ratio distribution and torque output of a carbureted light aircraft piston engine. Final report, May 1981-September 1982.** Sung, N.W.; Morrison, K.; Patterson, D.J. (Michigan Univ., Ann Arbor (USA). Dept. of Mechanical Engineering). Mar 1982. 34p. NTIS, PC A03/MF A01.

A comprehensive sea - level - static test cell data collection and evaluation effort to review operational characteristics of a carbureted light aircraft piston engine as related to fuel volatility and air fuel ratio distribution to cylinders. Sea - level - static test cell engine operations were conducted utilizing an AVCO Lycoming 0-320 engine connected to an eddy current dynamometer which facilitated data collection under various engine load conditions. Test cell instrumentation was utilized to obtain operational data (temperatures, pressures, flow rates, torque, horsepower, exhaust emissions, etc.) from idle through cruise to maximum power with fuel grades having reid vapor pressure of 6.7, 11.7 and 14.0. The primary purpose of test cell engine operation was to observe real time performance characteristics associated with automotive grade fuel utilized by piston powered light general aviation aircraft. In fulfillment of this task, baseline engine operations were established with 100LL aviation grade fuel followed by two blends of automotive grade fuel.

54198 **(CONF-8108168—1) Diesel-engine fumigation with aqueous ethanol.** McLaughlin, S.L.; Stephenson, K.Q. (Pennsylvania State Univ., University Park (USA). Dept. of Agricultural Engineering). 1981. 23p. NTIS, PC A02/MF A01. Order Number DE83902935.

From North Atlantic Region meeting of the American Society of Agricultural Engineers; St. Catherines, Canada (9 Aug 1981).

A three cylinder, two cycle diesel engine, rated at 22KW at 2300 rpm, was fumigated with ethanol of 140-to-200 proofs. P-T diagrams and engine performance were analyzed with particular emphasis on the detection and evaluation of the knock phenomenon. Satisfactory full load operation was obtained with thirty percent of the fuel energy supplied as aqueous ethanol.

54199 **(NP—3770401) Improving the torque behaviour of exhaust gas-turbocharged vehicle diesel engines.** Engels, B. (Technische Hochschule Aachen (Germany, F.R.). Fakultaet fuer Maschinenwesen). 30 Mar 1981. 119p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83770401.

Thesis.

In order to improve the torque behaviour of vehicle diesel engines with exhaust gas turbocharger theoretical and experimental studies are made to show the effect of parameters of the engine and turbocharger. The results permit utilization of specific properties of the system parts for a higher torque while keeping the speed down and without increasing the nominal ignition pressure in the engine. The studies are made with a turbocharged six-cylinder engine, the turbocharger of which is equipped with a twin-flow-turbine.

3303 Electric-powered Systems

REFER ALSO TO CITATION(S) 54046, 54047, 54151

54200 **(NP—3770408) Study on a drive with synchronous engine for electric powered vehicles.** Fuchs, W. (Technische Hochschule Aachen (Germany, F.R.). Fakultaet fuer Elektrotechnik). 26 Jun 1981. 184p. (In German). NTIS (US Sales Only), PC A09/MF A01. Order Number DE83770408.

Portions are illegible in microfiche products; Thesis.

An a.-c. driving unit destined for use in an electric powered vehicle is studied consisting of a synchronous engine, a converter with load independent current in the indirect circuit and a battery. Three specially developed simulation programs are used to analyse the driving unit with special regard to operational behaviour, utilization, overload capacity and power loss. The first part deals with the utilization possibilities of the synchronous drive in a vehicle based on the capacity demands of road traffic. In the second part a control method is developed which makes it possible to operate the actuator and the inverter synchronously in an adequate way. In the third part a control method for the speed range above the type point is developed and investigated for quasi-stationary operation. Given an interconnected d.c.-chopper converter with indirect circuit control this method uses the inverted rectifier for control.

3306 Vehicle Design Factors

54201 **(PB—83-194381) EPA (Environmental Protection Agency) evaluation of the P.A.S.S. kit device under Section 511 of the Motor Vehicle Information and Cost Savings Act. Technical report.** Barth, E.A. (Environmental Protection Agency, Ann Arbor, MI (USA)). Sep 1982. 32p. (EPA-AA-TEB—511-82-14). NTIS, PC A03/MF A01.

This document announces the conclusions of the EPA evaluation of the P.A.S.S. Kit device under the provisions of Section 511 of the Motor Vehicle Information and Cost Savings Act. The evaluation of the P.A.S.S. Kit device was conducted upon receiving an application for evaluation by the marketer. The P.A.S.S. Kit device is an intake manifold vacuum switch that is designed to disengage the air conditioning compressor during periods of high power demand. The device is claimed to eliminate the load of air conditioning compressor when accelerating and thereby improve fuel economy and performance. EPA fully considered all of the information submitted by the applicant. The evaluation of the P.A.S.S. Kit device was based on that information and the results of the EPA confirmatory testing of a similar device. The overall conclusion is that P.A.S.S. Kit should recover part of the emissions and fuel economy penalty incurred by using the air conditioner of some vehicles.

3307 Emission Control

REFER ALSO TO CITATION(S) 54195, 54201

3308 Alternative Fuels

REFER ALSO TO CITATION(S) 53738, 53743, 54198

36 MATERIALS

54202 **(PB—83-231365) Evaluative report on the Institute for Materials Research, National Bureau of Standards - fiscal year 1976. Annual report.** (National Academy of Sciences, Washington, DC (USA). Assembly of Mathematical and Physical Sciences). 1977. 43p. NTIS, PC A03/MF A01.

The Institute for Materials Research (IMR), one of the major organizational units of the National Bureau of Standards, conducts research to provide a better understanding of the basic properties of materials and develops methodology and standards for measuring their properties to help ensure effective utilization of technologically important materials by the nation's scientific, commercial, and industrial communities. This report covers activities of the Institute during the 12 months preceding the Panel meeting on January 26-27, 1976.

54203 **(PB—83-231373) Evaluative report on the Institute for Materials Research, National Bureau of Standards - fiscal year 1977. Annual report.** (National Academy of Sciences, Washington, DC (USA). Assembly of Mathematical and Physical Sciences). 1978. 40p. NTIS, PC A03/MF A01.

The Institute for Materials Research (IMR), one of the major organizational units of the National Bureau of Standards, conducts research to provide a better understanding of the basic properties of materials and develops methodology and standards for measuring their properties to help ensure effective utilization of technologically important materials by the nation's scientific, commercial, and industrial communities. This report covers activities of the Institute during the 12 months preceding the Panel meeting on January 25-26, 1977.

54204 **(Y/DU—301) Hierarchical trees for accelerated aging studies.** Churnetski, E.L. (comp.). (Oak Ridge Y-12 Plant, TN (USA)). 8 Sep 1983. Contract W-7405-ENG-26. 12p. NTIS, PC A02/MF A01. Order Number DE83017845.

Portions are illegible in microfiche products.

The preliminary tests are complete which define the relationship between tensile strength and prebond oxide thickness for uranium/LW-520/uranium bonds. Figures show the tested specimens and the raw data obtained when uranium tensile specimens, both machined and electro-cleaned, with controlled exposure to moisture at 80°C, were bonded, cured, and tested. The results show that catastrophic failure occurs to specimens which have had ~ 6 and 12 hours of exposure, resulting in predicted oxide thickness of 100 nm. Measurements of the actual oxide thicknesses are presently in progress.

54205 **(ZfK—489) Annual report 1981. Nuclear Fuel Research Department.** Nebel, D. (ed.). (Zentralinstitut fuer Kernforschung, Rossendorf bei Dresden (German Democratic Republic)). Dec 1982. 259p. (In German). NTIS (US Sales Only), PC A12/MF A01. Order Number DE83703476.

Extended synopses on research activities have been compiled under the following headings: oxide materials, chemistry of solutions, materials investigations, analytical chemistry, methods, devices, and equipment. A list of publications is included.

3601 Metals And Alloys

REFER ALSO TO CITATION(S) 53434, 53652, 53656, 53656, 53670, 53929, 54019, 54276, 54311, 54368, 54378, 54379, 54380, 54381, 54382, 54382, 54383, 54384, 54772, 55218, 55220, 55282

54206 **(AD-A—129057/6) Analysis of thermal conductivity data for fourteen elements in normal and superconducting states. State-of-the-art report.** Rafalowicz, J.A. (Purdue Univ., Lafayette, IN (USA). Thermophysical and Electronic Properties Information Center). Jul 1974. 42p. (CINDAS-TPRC—28). NTIS, PC A03/MF A01.

Using thermal conductivity data from TPRC's data bank for fourteen metallic elements in both normal and superconducting states, the superconducting transition temperature, the thermal conductivity at the transition temperature, and the purity of the samples have been estimated by graphical methods. Two basic relationships correlating the thermal conductivity at the transition temperature with the sample purity and correlating the transition temperature with the thermal conductivity at the transition temperature have been established for twelve of the fourteen elements investigated.

54207 **(AD-A—129176/4) Electrical resistivity of vanadium and zirconium. State-of-the-art report.** Desai, P.D.; James, H.M.; Ho, C.Y. (Purdue Univ., Lafayette, IN (USA). Thermophysical and Electronic Properties Information Center). Dec 1982. 73p. (CINDA—63). NTIS, PC A04/MF A01.

This work compiles, reviews, and discusses the available data and information on the electrical resistivity of vanadium and zirconium and presents the recommended values resulting from critical evaluation, correlation, analysis, and synthesis of the available data and information. The recommended values presented are uncorrected and also corrected for the thermal expansion of the material and cover the temperature range from 1 K to above the melting point into the molten state. The estimated uncertainties in most of the recommended values are about + or - 2% to + or - 5%.

54208 **(BNL—33666) Characterization of Alloy 600 surfaces after exposure to a caustic environment.** Isaacs, H.S.; Kraner, H.W.; Hanson, A.L. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 15p. (CONF-830845—4). NTIS, PC A02/MF A01. Order Number DE83018297.

From Environmental degradation of materials in nuclear power systems-water reactors; Myrtle Beach, SC, USA (22 Aug 1983).

The surface morphology and compositions of as-received and electropolished Alloy 600 surfaces have been studied using scanning electron microscopy and $^4He^+$ Rutherford Backscattering. The samples were exposed to 1% NaOH with 1% Na_2CO_3 solutions over a range of potentials. The as-received surfaces did not show any distinctive changes whereas the electropolished surfaces were markedly dependent on the underlying metal. Between -90 and 70 mV, relative to a nickel/hydrogen electrode, the active surface showed a distinct grain boundary and grain orientation dependent etching. These surfaces were also covered by a nickel layer which decreased in thickness with potential from 100 nm at -90 mV and was not observable at 70 mV. At 170 and 225 mV a highly stressed oxide was observed which spalled off entire grains. These surfaces would be expected to show a dependence on temperature cycling. At higher potentials at and above 270 mV duplex surface oxides with high nickel outer layers and high chromium inner layers were observed.

54209 **(DOE/ER/10596—3) Conditions for dropwise condensation on electroplated gold. Final report, February 15, 1980-August 14, 1983.** Westwater, J.W. (Illinois Univ., Urbana (USA). Dept. of Chemical Engineering). Aug 1983. Contract AC02-80ER10596. 8p. NTIS, PC A02/MF A01. Order Number DE83017892.

This research is concerned with the use of thin coatings of gold, silver, and chromium on metal to produce dropwise condensation of steam. Dropwise condensation is preferred to filmwise condensation, because it has much larger heat transfer coefficients. For example, the use of dropwise condensation in ocean thermal energy conversion could result in dramatic reductions in the size of heat exchangers. Tests have been conducted on numerous gold and silver deposits, with and without brighteners or alloying ingredients, in controlled thicknesses. A critical plating thickness of gold or silver in the order of 100 m is needed to produce dropwise condensation. A thin plate such as 20 nm is not effective. The test surfaces have been analyzed by Auger spectroscopy and examined by electron microscopy. The results indicate that the role of gold or silver is to provide an oxide-free surface for tenacious absorption of some trace organic material. Future work is aimed at identifying the organic species and its source. Preliminary tests show that chromium plating also can produce dropwise condensation. Future work will expand the testing of chromium.

54210 **(DP-MS—82-55) Helium damage in austenitic stainless steels.** Caskey, G.R. Jr.; Mezzanotte, D.A. Jr.; Rawl, D.E. Jr. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1983. Contract AC09-76SR00001. 21p. (CONF-830317—3). NTIS, PC A02/MF A01. Order Number DE83017494.

From TMS/AIME meeting; Atlanta, GA, USA (6 Mar 1983).

Portions are illegible in microfiche products.

Helium produced by tritium decay was first shown to embrittle austenitic stainless steel at ambient temperature in tensile specimens of Nitronic-40 steel (Armco, Inc.). A long-term study was initiated to study this form of helium damage in five austenitic alloys. Results from this study have been analyzed by the J-integral technique and show a decrease in ductile fracture toughness with increasing He-3 concentration. Sustained-load cracking tests indicate that the stress intensity required to initiate and propagate a crack also decreases with increasing He-3 concentration. 9 figures, 3 tables.

54211 **(EUR—8191-EN) Fatigue crack growth and fracture resistance of steels in high-pressure hydrogen environments. Final report.** Priest, A.H. (British Steel Corp., London). 1983. 65p. European Community Information Service, 2100 M Street, NW, Suite 707, Washington, DC 20037.

An evaluation has been made of the effects of hydrogen pressure and cyclic frequency on the fatigue properties of eight steels, most of which are currently used in the manufacture of gas cylinders. The evaluation has included CrMo and CMn types of steels and material with strength levels close to the bottom and top of the currently specified range. The results indicate a marked influence of hydrogen pressure on the fatigue behavior of all eight

steels. At hydrogen pressures of 150 bar and above even the most resistant steel shows a sixteen-fold increase in fatigue crack growth rate when compared with data obtained in nitrogen gas at a similar pressure. The cyclic frequency has also been observed to influence the fatigue behavior in a smaller, but still significant, manner. In general the fatigue crack growth rates increase as the frequency is reduced, with the most marked acceleration produced as the fequency drops from 10 to 1 Hz. In CrMo steels the greatest resistance to hydrogen accelerated fatigue crack growth was exhibited by material with a tempered martensite microstructure containing a uniform distribution of fine carbide precipitates. 44 figures.

54212 **(FEI—1302) Impurities diffusion in uranium: cobalt diffusion.** Pavlinov, L.V.; Evstratov, V.D. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk. Fiziko-Ehnergeticheskij Inst.). 1982. 10p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703557.

Radioactive isotope ^{60}Co was used to investigate cobalt diffusion in α- , β- and γ-uranium phases. Diffusion factors were determined by a numerical version of the integral residue method at 550-640 deg (α-phase), 690-750 deg (β-phase) and 800-1000 deg C (γ-phase). The equations were obtained for temperature dependences of diffusion factors. The equations obtained are discussed form the viewpoint of concepts of local fusion of matrix crystal lattice in the vicinity of an impurity atom.

54213 **(FEI—1307) Study of iron self-diffusion in gamma-phase field of iron-chromium binary system.** Gladyshev, A.M.; Pavlinov, L.V.; Sugonyaev, V.N. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk. Fiziko-Ehnergeticheskij Inst.). 1982. 6p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703558.

Chromium effect on iron self-diffusion in the temperature range of 850 to 1250 deg C is studied using Fe-59 radioactive isotope. The investigations are carried out on specimens of iron base alloy with 1.05; 2.06; 2.89; 6.0 and 10.0 wt% chromium. Diffusion factors are determined by an analytical variant of the integral residue method. Temperature dependences of diffusion factors are described by the Arrhenius equation. The tendency to a decrease for diffusion parameter values in iron-(1-10)% chromium alloys is marked in comparison with analogous parameters for self-diffusion in pure γ-iron, a decrease of self-diffusion activation energy being most pronounced in iron-(1-2)wt% chromium alloys.

54214 **(GKSS—82/E/28) Magnetic, Moessbauer effect, and neutron small angle scattering measurements on iron clusters in A-zeolites.** Adolph, J. (GKSS-Forschungszentrum Geesthacht G.m.b.H., Geesthacht-Tesperhude (Germany, F.R.); Hamburg Univ. (Germany, F.R.). Fachbereich Physik). 1982. 134p. (In German). Available from GKSS-Forschungszentrum Geesthacht G.m.b.H., Geesthacht-Tesperhude (Germany, F.R.).

Thesis.

In order to produce as small iron clusters as possible we reduced Fe^{2+}-ion-exchanged A-zeolites for 85 h at 573 K. Ion-exchange and reduction were investigated by Moessbauer spectroscopy. To find out the magnetic properties and the cluster size we carried out magnetization measurements from 10 K to 243 K. In addition we determined the particle size of the iron clusters using neutron small-angle scattering. This method of investigation has been applied to zeolitic-metal contacts for the first time. We have found that iron clusters with a radius of 0,57 nm show the same spontaneous magnetization as bulk iron. Because of this result it is now possible, to apply the method of particle size determination by magnetization measurements to iron clusters with a radius down to ca. 0,57 nm.

54215 **(IS-M—455) Life prediction under stress corrosion conditions below K/sub ISCC/.** Ranjan, R.; Buck, O. (Ames Lab., IA (USA)). 1983. Contract W-7405-ENG-82. 8p. (CONF-830811—12). NTIS, PC A02/MF A01. Order Number DE83018074.

From Conference on quantitative NDE; Santa Cruz, CA, USA (7 Aug 1983).

Under stress corrosion conditions, the major portion of the useful life of a structure, originally free of defects, is spent during incubation and growth of microcracks. On the other hand, microcrack initiation is one of the least-well-understood phenomena and a prediction of the remaining life of a component in service is very difficult. Therefore, a physical model was developed which, at the present time, is specific to stress-corrosion cracking (S.C.C.) of Cu-30Zn brass in a nontarnishing ammoniacal solution. The predictions of the model in terms of time to initiation were tested using experimental data of the effects of applied stress on crack initiation. Metallographic observations and scanning electron microscopy provided information on the transition from corrosion pitting to microcrack initiation. This transition occurs at a critical pit size of about μm, which will increase with decreasing stress. implications of this research on nondestructive evaluation of S.C.C. in the microcrack-initiation regime are briefly discussed.

54216 **(IS-M—459) Moessbauer spectroscopy study of amorphous $Fe_{87}B_{11}Au_2$ ribbon and its crystallization products.** Lin, M.C.; Barnes, R.G. (Ames Lab., IA (USA)). 1983. Contract W-7405-ENG-82. 14p. (CONF-831187—1). NTIS, PC A02/MF A01. Order Number DE83018091.

From MMM conference; Pittsburg, PA, USA (8 Nov 1983).

Substantial increases in Fe saturation magnetization have been obtained in amorphous Fe-B containing small concentrations of gold. This material is also stable above 300 K, and thus has considerable practical significance. This paper reports the results of an investigation of amorphous $Fe_{87}B_{11}Au_2$ ribbon and its crystallization products based on ^{57}Fe Moessbauer spectroscopy. The amorphous ribbon exhibits a broad magnetic hyperfine splitting pattern typical of a metallic glass with an effective hyperfine field, H/sub eff/ = 257 kOe, and an isomer shift of 0.058 mm/s relative to metallic Fe at 300 K. The spectra of samples annealed for 25 min between T/sub A/ = 618 K and 708 K arise from a metastable amorphous phase of Fe-Au-B and a crystalline α-Fe phase. H/sub eff/ of the metastable amorphous phase decreases with respect to increased annealing temperature. However, H/sub eff/ of the α-Fe phase increases from 331 kOe for samples annealed at 618 K to 334 kOe for those annealed at 708 K. This increase can be attributed to an increased content of Au in the α-Fe phase. Annealing the samples at temperatures above 753 K for 25 min yields crystalline α-Fe and the intermetallic compound Fe_2B.

54217 **(JINR—18-82-558) Effect of high-energy ion irradiation on aluminium creep.** Vorob'ev, E.D.; Regel', V.R.; Senesh, D.; Skuratov, V.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions). 1982. 7p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703559.

The dependence of creep velocity of thin aluminium samples on loading at irradiating with 70 MeV carbon ions is investigated. It is shown that this dependence can be described by epsilonsub(j) approximately esup(vσ) epsilonsub(j) approximately (σ-σsub(0))sup(n) formulas. The experimental data on deformation "jumps" of investigated samples are discussed.

54218 **(Juel—1814) Spectroscopic investigations of the physical state of helium in small bubbles in aluminium and nickel films.** Manzke, R. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Festkoerperforschung). Nov 1982. 89p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83751050.

Thesis. Submitted to Koeln Univ. (Germany, F.R.).

The physical state of helium in small bubbles in aluminium and nickel films (500-1000 A thick) with average He concentrations between 1 and 30 at.% has been investigated by transmission electron energy-loss spectroscopy (EELS) with 50 and 200 KeV electrons using a new UHV-spectrometer, transmission electron microscopy (TEM), and proton enhanced scattering (PES).

54219 (LBL—14178) **Influence of alloy composition on the cryogenic mechanical properties of AISI 200 grade high-manganese austenitic steels.** Ogawa, R.; Morris, J.W. Jr. (Lawrence Berkeley Lab., CA (USA)). May 1982. Contract AC03-76SF00098. 11p. (CONF-820546—17). NTIS, PC A02/MF A01. Order Number DE83017518.

From 9. international cryogenic engineering conference; Kobe, Japan (10 May 1982).

Research on the effect of composition on the cryogenic mechanical properties of high-Mn austenitic steels showed that both the yield strength and change of strength with alloy processing increased significantly with increasing interstitial content. Alloy toughness deteriorated if carbon content was raised to 0.1% or higher or if δ-ferrite was retained in the as-cooled alloy. On the basis of these investigations an alloy of nominal composition 18Mn-5Ni-16Cr-0.024C-0.22 N was made and tested at 4K. Both its strength-toughness characteristic and fatigue crack growth properties compared favorably to those of 304LN and 304N cryogenic steels.

54220 (LBL—16031, pp 245-250) **Effects of HVEM irradiation on ordered phases in Ni-Ti.** Pelton, A.R. (Stanford Univ., CA). Jun 1983. NTIS, PC A19/MF A01. (CONF-830819—).

From 7. international conference on high voltage microscopy; Berkeley, CA, USA (16 Aug 1983).

Various ordered phases in the Ni-Ti system were subjected to electron irradiation in the Berkeley HVEM. Austenitic NiTi (B2 structure) disorders and turns amorphous with room-temperature irradiations at accelerating potentials between 1 and 1.5 MeV. Total doses for the onset of amorphiticity range between 0.7 x 10^{23} and 3 x 10^{23} e.cm^{-2} (0.4 to 1.0dpa). At 90K the dose requirement decreases to 4 x 10^{20}e.cm^{-2} (~ 10^{-3}dpa). Martensitic NiTi (distorted monoclinic structure) readily detwins and transforms to austenite when irradiated for short times (~ 10 seconds). Vapor-deposited amorphous films were crystallized to produce NiTi, Phase X (ordered nickel-rich phase with unknown structure) and Ni_3Ti (DO_{24} structure). Upon electron irradiation, NiTi and Phase X disorder and become amorphous, while Ni_3Ti disorders but does not turn amorphous with doses up to 4 x 10^{23}e.cm^{-2} at 90K. These results are discussed in terms of the requirement of a critical concentration of defects and their relative mobilities. Brimhall's solubility criteria for amorphization of ordered alloys by ion bombardment is apparantly applicable to electron-induced crystalline to amorphous transitions in this alloy.

54221 (LBL—16031, pp 251-254) **Order-disorder transition in Ni_4Mo induced by electron irradiation in a high-voltage microscope.** Banerjee, S.; Urban, K. (Max-Planck-Institut fuer Metallforschung, Stuttgart, Germany). Jun 1983. NTIS, PC A19/MF A01. (CONF-830819—).

From 7. international conference on high voltage microscopy; Berkeley, CA, USA (16 Aug 1983).

A brief report is given on a study on the order-disorder reaction in Ni_4Mo induced by electron irradiation at low temperatures. Analysis of the steady states occurring as a result of the competition of radiation disordering and radiation-enhanced reordering yielded information on the basic transformation behaviour of the alloy. The results corroborate the spinodal ordering model. A kinetic treatment of the order-disorder reaction under irradiation is outlined. It permits to calculate the steady-state degree of long-range order in fair agreement with experimental data.

54222 (LBL—16031, pp 255-260) **In situ ion implantation of N^+ in aluminum.** Donlon, W.T. (Ford Motor Co., Dearborn, MI); McCune, R.C.; Mitchell, T.E. Jun 1983. NTIS, PC A19/MF A01. (CONF-830819—).

From 7. international conference on high voltage microscopy; Berkeley, CA, USA (16 Aug 1983).

High purity (99.999%) aluminum foils were implanted with N^+ ions at various temperatures in the Argonne National Labs. HVEM-TANDEM facility. The evolution of the ion damage was observed as the implantation occurred up to doses of 2 x 10^6 ions cm^{-2} (~0.1 dpa). Subsequent annealing of implanted specimens in the HVEM at .89 T/sub m/ caused the clustering of implanted nitrogen to form nitrogen gas bubbles.

54223 (LBL—16031, pp 273-278) **In-situ oxidation studies of vanadium-20% titanium alloy.** Hackney, S.A. (Univ. of Virginia, Charlottesville); Kenik, E.A.; Carpenter, R.W.; Lawless, K.R. Jun 1983. NTIS, PC A19/MF A01. (CONF-830819—).

From 7. international conference on high voltage microscopy; Berkeley, CA, USA (16 Aug 1983).

V-20Ti alloys have been oxidized in-situ in the ORNL HVEM at temperatures from 300 to 600°C, and at an oxygen pressure of 3 x 10^{-5} torr. Results show the initial formation of a fine tweed structure with the associated diffraction pattern characterized by short, well defined streaks through the matrix reflections due to <110> rel rods. At 400 to 600°C, this tweed structure is followed by a transformation to a bct structure with a c/a ratio of ~ 1.2. Surface oxide was formed in the 400 to 600°C range and was identified as V_2O_3(R3c), but containing some titanium. No evidence for long period superlattices such as occur in the oxidation of vanadium was found.

54224 (LBL—16031, pp 307-310) **Disordering under HVEM irradiation.** Waiting, J.F.; Butler, E.P. (Imperial College, London, England). Jun 1983. NTIS, PC A19/MF A01. (CONF-830819—).

From 7. international conference on high voltage microscopy; Berkeley, CA, USA (16 Aug 1983).

An investigation has been made of the effects of high energy electron irradiation on the degree of long-range order S in fully ordered Ni_3Al, Ni_3Fe, NiAl and FeAl. The irradiations were carried out at temperatures between 15K and 305K and accelerating voltages of 600 kV and 1 MV. At low temperatures, below which vacancies can be considered immobile, all the alloys, except NiAl, became fully disordered when irradiated above the threshold displacement energy and the disordering rate increased with decreasing temperature and increasing accelerating voltage. The results are consistent with disordering by the propagation of replacement collision sequences down mixed-atom rows, with the energy of the primary knock-on defining the length of the sequence and the temperature dependence arising from an attenuation of sequence length due to lattice vibrations. Non-stoichiometric Al-rich NiAl is resistant to disordering have a high ordering energy and concentration of nickel vacancies which favour correlated athermal recombination events.

54225 (LBL—16031, pp 315-318) **HVEM studies of precipitate morphology symmetries.** Dahmen, U.; Ferguson, P.; Westmacott, K.H. (Lawrence Berkeley Lab., CA). Jun 1983. NTIS, PC A19/MF A01. (CONF-830819—).

From 7. international conference on high voltage microscopy; Berkeley, CA, USA (16 Aug 1983).

Examples are shown to illustrate the effectiveness of the HVEM in the analysis of microstructural symmetries of precipitates in a cubic matrix. These examples include Ta, Fe-Cu, Cu-Cr, and Fe-N.

54226 (LBL—16031, pp 319-322) **HVEM in-situ studies of precipitate coarsening and dissolution in a Pt-C alloy.** Ackland, D.; Dahmen, U.; Westmacott, K.H. (Lawrence Berkeley Lab., CA). Jun 1983. NTIS, PC A19/MF A01. (CONF-830819—). Contract AC03-76SF00098.

From 7. international conference on high voltage microscopy; Berkeley, CA, USA (16 Aug 1983).

The dissolution of thin (001) carbide precipitates in Pt during in-situ annealing in a high voltage electron microscope was found to proceed at a constant rate which was markedly different for α and α′ precipitates. At the same time, the beginning of the transition from the α to the α′ stage of precipitation was observed in thick foil sections corresponding to established bulk behavior.

54227 (LBL—16031, pp 323-324) **Structure of electrodeposited chromium.** Fisher, R.M.; Westmacott, K.H. (Lawrence Berkeley Lab., CA). Jun 1983. NTIS, PC A19/MF A01. (CONF-830819—). Contract AC03-76SF00098.

From 7. international conference on high voltage microscopy; Berkeley, CA, USA (16 Aug 1983).

The effect of plating conditions on the columnar grain structure of electrodeposited chromium, the nature of the residual stress-

es, and the distribution of entrapped plating solution (H_2CrO_4) have been studied using high voltage and scanning electron microscopy and electron and ion beam microanalytical techniques. A low temperature and/or low current density result in the formation of very small grain diameters ($\sim$ 0.1 μm), a strong <111> fiber texture, large internal stresses ($\epsilon \sim 1\%$), and up to 2% trapped electrolyte.

54228 (LBL—16031, pp 145-150) **Electron damage in Zr and Ti.** White, J.; Griffiths, M.; Loretto, M.H.; Smallman, R.E. (Univ. of Birmingham, England). 1983. NTIS, PC A19/MF A01. (CONF-830819—).

From 7. international conference on high voltage microscopy; Berkeley, CA, USA (16 Aug 1983).

Specimens of Zr (<99.9%) and Ti (99.8%) have been electron irradiated at temperatures up to 873 K using a 1 MV electron microscope. The damage structure has been analyzed at room temperature and the results show that in Zr and Ti both vacancy and interstitial loops of b = 1/3 <1120> nucleate and grow. In addition vacancy loops of b = 1/2[0001] and interstitial loops of b = 1/3 <1123> are formed in Zr specimens which have foil normals (N) near [0001] and <1210> respectively. In the case of Ti, complex loops, which microanalysis shows contain Fe, are observed at higher irradiation temperatures. In all cases there is a partitioning of loops such that vacancy loops generally tend to have b as near parallel as possible to N and interstitial loops similarly have b perpendicular to N. The observations are discussed in terms of the factors which may be responsible for the stability of vacancy loops in Zr and Ti.

54229 (LBL—16031, pp 151-156) **Migration of interstitials in βNb-Zr alloys during electron irradiation by using a high voltage electron microscope.** Nakai, K.; Kinoshita, C.; Kitajima, S. (Kyushu Univ., Fukuoka, Japan). 1983. NTIS, PC A19/MF A01. (CONF-830819—).

From 7. international conference on high voltage microscopy; Berkeley, CA, USA (16 Aug 1983).

Through examining the nucleation and growth process of dislocation loops in Nb-3.1 and 10.0 wt.% Zr alloys during electron irradiation, apparent migration energies of interstitials have been determined. For these alloys two kinds of interstitials, Nb- and Zr-interstitials, contribute to the formation of loops. In order to understand the kinetic behavior of them simulation was performed by use of rate equations for defects produced under irradiation based on an assumption that three kinds of di-interstitials, Nb-Nb, Nb-Zr and Zr-Zr, act as nuclei of loops. The simulated results showed that each interstitial changes their concentration against irradiation time just like their behavior being in pure metals. Based on the idea used for pure metals, analytical formulation for loop formation was performed and the factor of controlling migration of interstitials was clarified. Migration of Nb-interstitials exerts an influence on the formation of loops and the apparent migration energy obtained experimentally correspond to that of Nb-interstitials.

54230 (LBL—16031, pp 157-162) **Formation of point defect clusters in electron irradiated germanium.** Hirata, M. (Osaka Univ., Japan); Kiritani, M. 1983. NTIS, PC A19/MF A01. (CONF-830819—).

From 7. international conference on high voltage microscopy; Berkeley, CA, USA (16 Aug 1983).

Electron irradiation of germanium below 200°K results in the formation of faulted interstitial loops on [113] planes after fairly long incubation period. The formation is strongly dependent both on crystallographic orientation and electron diffraction condition. After prolonged irradiation, small vacancy type defects (less than 50 A) of higher density appear in the thinner part of a specimen normally free from interstitial type loops. The intensional contamination of pure specimen by carbon deposition has been found to lead to the formation of vacancy type faulted loops on [113] planes at narrow temperature range around 250°C. The analysis of the shrinkage behaviour of these defect clusters by annealing at above 500°C leads to the conclusion that the self-diffusion in germanium is carried with vacancy type point defects.

54231 (LBL—16031, pp 181-186) **Cavity growth in dual-ion and/or electron irradiated type 316 stainless steel.** Kohyama, A. (Univ. of Tokyo, Japan); Kohno, Y.; Suzuki, K.; Ayrault, G.; Takeyama, T.; Igata, N. 1983. NTIS, PC A19/MF A01. (CONF-830819—).

From 7. international conference on high voltage microscopy; Berkeley, CA, USA (16 Aug 1983).

In-situ observations of the cavity growth process in dual-ion irradiated or He preinjected samples were performed using HVEMs. The objective of this study is to analyze cavity growth mechanisms as functions of cavity size and of injected He concentration. The materials used were 20% cold-worked (CW) and solution annealed and aged (SAA) type 316 SS. Dual-ion irradiation was carried out at ANL. In-situ observations of damage process were performed in a JEM-1250 or HU-1300 with 1000 keV electrons. Dual-ion irradiation of SAA samples produced bimodal cavity size distributions. Dual-ion irradiation of CW samples produced unimodal cavity size distributions with mean size less than 7 nm. Electron irradiation caused rapid growth of cavities larger than the critical size; the critical radius was 4, 5 and 7 nm at 400, 500, and 600 C irradiation, respectively. The average sizes of cavities smaller than the critical size were not changed by electron irradiation followed to dual-ion irradiation. Electron irradiation of He preinjected samples produced bimodal cavity size distributions. Without He preinjection, electron irradiation produced unimodal cavity size distributions with most cavities larger than the critical size. These results provide clear evidence of bias-driven and pressure-driven cavity growth mechanism.

54232 (LBL—16031, pp 187-192) **Influence of nitrogen and carbon on void swelling in 316 stainless steel in-situ observed by a HVEM.** Igata, N.; Kohno, Y.; Tanabe, N.; Rotman, F.; Tsunakawa, H. (Univ. of Tokyo, Japan). 1983. NTIS, PC A19/MF A01. (CONF-830819—).

From 7. international conference on high voltage microscopy; Berkeley, CA, USA (16 Aug 1983).

Effects of nitrogen and carbon on void swelling in 316 austenitic stainless steel were investigated by in-situ observation using a HVEM. Specimens were solution treated or 20% cold worked. Electron irradiation was carried out at 600C. In each specimen swelling increased linearly with dose after incubation period. In solution treated specimens, swelling decreased with nitrogen and carbon concentration. This descrease is attributed to the decrease of swelling rate. Incubation dose slightly decreased with nitrogen and carbon concentration but this decrease had little contribution to the observed variation of swelling. Void number density first decreased, and then increased with nitrogen and carbon concentration. While, the tendency was reverse for mean void diameter, so that it first increased and then decreased. In cold worked specimens the swelling rates were nearly the same as those of solution treated specimens for the equal concentration of nitrogen and carbon, but with shorter incubation doses. Void number density increased and mean void diameter decreased with nitrogen and carbon concentration. The behaviors of nitrogen and carbon in irradiated stainless steel is discussed.

54233 (LBL—16031, pp 199-204) **In situ deformation and fracture studies on precipitation-hardened aluminum alloys.** Kenik, E.A. (Oak Ridge National Lab., TN); Crooks, R.; Starke, E.A. 1983. NTIS, PC A19/MF A01. (CONF-830819—). Contract W-7405-ENG-26.

From 7. international conference on high voltage microscopy; Berkeley, CA, USA (16 Aug 1983).

In situ deformation studies have been undertaken in order to understand the deformation processes that operate in precipitation-hardened alloys and their role in the pronounced embrittlement and tendency toward strain localization that cause premature failure in the hardened condition. The role of precipitate-free zones (PFZ) at grain boundaries on strain localization and failure mode has been investigated in aluminum-based alloys (Al-Zn-Mg and Al-Li).

54234 (LBL—16031, pp 233-238) **Crystalline-amorphous transition in NiTi alloys induced by high-energy electron irradiation.** Fujita, H.; Mori, H.; Fujita, M. (Osaka Univ., Japan). 1983. NTIS, PC A19/MF A01. (CONF-830819—).

From 7. international conference on high voltage microscopy; Berkeley, CA, USA (16 Aug 1983).

A crystalline-amorphous transition in NiTi alloys induced by electron irradiation has been studied by high voltage electron microscopy. The transition takes place in the following; A number of small amorphous regions are formed in the crystalline matrix at the beginning stages of irradiation, and then they grow in size until coalesce with each other into one body. The amorphous transition preferentially occurs along such defects as dislocations and grain boundaries in general. This is closely related to the high sink efficiency of these defects for interstitials induced by irradiation. Crystalline-amorphous transition has also been investigated in various intermetallic compounds. 6 figures.

54235 (LBL—16031, pp 239-244) **Comparison of the effect of electron and ion irradiation on crystallization of amorphous alloys.** Brimhall, J.L. (Pacific Northwest Lab., Richland, WA). 1983. NTIS, PC A19/MF A01. (CONF-830819—). Contract AC06-76RL01830.

From 7. international conference on high voltage microscopy; Berkeley, CA, USA (16 Aug 1983).

Electron irradiation during annealing in the HVEM, as well as heavy ion irradiation, lowered the crystallization temperature (T/sub c/) of two amorphous alloys (62Fe 16Cr 8Ni 14W, 50Mo 50Ni), but only heavy ion irradiation changed the mode of crystallization when compared to thermal annealing behavior. Heavy ion irradiation was more effective in lowering T/sub c/ than electron irradiation. The mode of crystallization during heavy ion irradiation was also different from either electron irradiation or thermal annealing in that ion irradiation produced an ultra fine grain, equilibrium phase directly from the amorphous matrix. The acceleration of crystallization was attributed to a radiation enhanced diffusion mechanism in the amorphous phase. The difference in crystallization mode was attributed to nucleation of the crystal phase in the displacement cascade region during heavy ion irradiation. During electron radiation, the absence of cascades precludes nucleation of the equilibrium phase. 6 figures.

54236 (MLM—3089) **Interface formation in physically deposited films.** Nesslage, G.V. (Monsanto Research Corp., Miamisburg, OH (USA). Mound). 8 Sep 1983. Contract AC04-76DP00053. 10p. NTIS, PC A02/MF A01. Order Number DE83018067.

Short (10 to 15 min) physical vapor deposition cycles are employed in fabricating thin films of 3 to 4 μm. Interruption of a cycle is of concern, particularly for longer cycles, since loss of processing time becomes a major factor when rejecting all interrupted runs. Several substrate samples having aluminum deposits that had been interrupted during the deposition cycle were prepared to evaluate the formation of interfaces between the layers. In the case where the deposition was interrupted but the thermal and vacuum conditions were maintained, the presence of a layer or interface was not detected by Auger Electron Spectrometry (AES), scanning electron microscopy (SEM) and optical microscopy analytical techniques.

54237 (OTA—3910803) **Materials information systems. Volume VI. Aluminum case study.** (Office of Technology Assessment (U.S. Congress), Washington, DC). Feb 1976. 86p. NTIS, PC A05/MF A01. Order Number DE83910803.

The survey of the aluminum segment of the materials community was designed to accomplish several objectives supportive of the total technology assessment: to gain insight into the nature of the existing materials information system, and the need for a new or improved system; to gain insight into the functional needs and the materials information management needs of a new or improved system, as a complement to surveys of senior policymakers; to test the general capabilities of the existing system; to evaluate data base quality; and to determine implications of the present form and uses of these data bases - to help assess the real world feasibility of the functional system concept.

54238 (PB—83-198895) **Small angle neutron scattering study of the damage induced by creep deformation in AISI 304 stainless steel.** Boeuf, A.; Coppola, R.; Matera, R.; Puliti, P.; Melone, S. (Commission of the European Communities, Luxembourg). [nd]. 99p. (EUR—7821-EN). NTIS, PC E05/MF E05.

Examination of the progressive appearance of microstructural modifications due to thermal aging alone and to creep at elevated temperatures (600C) is reported. Measurements of the morphology and distribution of cracks in the vicinity of fractures in rupture specimens have been made by optical and electron microscopy. As microvoids of radii of less than 30 A are not easily observed by transmission electron microscopy (TEM), this method is confined to precipitated intergranular and intragranular carbides. The intensity pattern of scattered neutrons has been used to derive the coherent neutron scattering cross-section for samples of the damaged steel.

54239 (SAND—83-1273C) **Chemical properties of metallic glasses.** Diegle, R.B. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 13p. (CONF-830888—8). NTIS, PC A02/MF A01. Order Number DE83017353.

From 5. international conference on liquid and amorphous metals; Los Angeles, CA, USA (15 Aug 1983).

Portions are illegible in microfiche products.

Research into chemical properties of metallic glasses has revealed promising behavior in the areas of corosion resistance and catalysis. Metallic glasses containing a film-forming element exhibit resistance to uniform and localized corrosion that is superior to that of many crystalline stainless steels. This resistance is due to the presence of passive films that are enriched in the film-forming element. Cr is particularly effective, especially if P is present as in transition metal-Cr-P glasses. Protective coatings are an obvious application of metallic glasses. Metallic glasses also show promise as catalysts and electrocatalysts. Some glasses containing Pd and P offer better reactivity and resistance to corrosion than crystalline noble elements for electrolytic chlorine production. Others have demonstrated an ability as catalysts to oxidize methanol for fuel cell application, and also for hydrogenation of carbon monoxide. The very uniform structure and unique meta-stable compositions characteristic of metallic glasses are keys to understanding the chemical behavior of this exciting class of materials.

54240 (UCID—19890) **Lithium equation-of-state.** Blink, J.A. (Lawrence Livermore National Lab., CA (USA)). Sep 1983. Contract W-7405-ENG-48. 15p. NTIS, PC A02/MF A01. Order Number DE83017988.

In 1977, Dave Young published an equation-of-state (EOS) for lithium. This EOS was used by Lew Glenn in his AFTON calculations of the HYLIFE inertial-fusion-reactor hydrodynamics. In this paper, I summarize Young's development of the EOS and demonstrate a computer program (MATHSY) that plots isotherms, isentropes and constant energy lines on a P-V diagram.

54241 **Structure and magnetism of Eu_3IrD_5.** Zhuang, J. (Brookhaven National Lab., Upton, NY); Kunnmann, W.; Corliss, L.M.; Hastings, J.M.; Moyer, R.O. Jr. *Journal of Solid State Chemistry;* 48: No. 1, 117-120(Jun 1983).

A powder neutron diffraction study of $Eu_3{}^{153}IrD_5$ has shown it to be isostructural with Sr_3IrD_5 at room temperature. Unlike the latter compound, it does not undergo a deuterium-ordering transition at low temperatures. Magnetic scattering at helium temperatures confirms the suggestion that it becomes ferromagnetic below 20 K with a moment corresponding to that of divalent europium.

54242 **Image analysis of particle perimeters.** Yost, F.G. (Physical Metallurgy Division, 5832, Sandia National Laboratories, Albuquerque, New Mexico 87185). *Metallography;* 16: No. 1, 99-106(Feb 1983). Contract AC04-76DP00789.

The results of Quantimet measurements of particle perimeter and cross-sectional area are reported. The objective was to determine whether increasing magnification would reveal enough additional detail to cause a significant increase in the measured perim-

eter. Measurements on particles having simple and relatively complex shapes were compared. Increased perimeters of both particle types were found with increasing magnification, while cross-sectional area estimates remained constant. These curious results are shown to be analogous to the behavior of certain mathematical curves.

54243 **Pyrochemical process for extracting plutonium from an electrolyte salt.** Mullins, L.J.; Christensen, D.C. US Patent Application 6-420,432. 20 Sep 1982. 10p. Contract W-7405-ENG-36.

A pyrochemical process for extracting plutonium from a plutonium-bearing salt is disclosed. The process is particularly useful in the recovery of plutonium for electrolyte salts which are left over from the electrorefining of plutonium. In accordance with the process, the plutonium-bearing salt is melted and mixed with metallic calcium. The calcium reduces ionized plutonium in the salt to plutonium metal, and also causes metallic plutonium in the salt, which is typically present as finely dispersed metallic shot, to coalesce. The reduced and coalesced plutonium separates out on the bottom of the reaction vessel as a separate metallic phase which is readily separable from the overlying salt upon cooling of the mixture. Yields of plutonium are typically on the order of 95%. The stripped salt is virtually free of plutonium and may be discarded to low-level waste storage.

54244 **Electroless metal plating of plastics.** Krause, L.J. US Patent Application 6-420,054. 20 Sep 1982. 15p. Contract W-31-109-ENG-38.

Process for plating main group metals on aromatic polymers is carried out by the use of a nonaqueous solution of a salt of an alkali metal in a positive valence state and a main group metal in a negative valence state with contact between the solution and polymer providing a redox reaction causing the deposition of the main group metal and the reduction of the polymer. Products from the process exhibit useful decorative and electrical properties.

54245 **Austenitic stainless steel-ferritic steel weld joint failures.** Klueh, R.L.; King, J.F. (Oak Ridge National Lab., TN). *Welding Research (Miami);* 302s-311s(Sep 1982). Contract W-7405-ENG-26.

The cause of failures of dissimilar-alloy (austenitic or ferritic) joints in superheater and reheater tubes of fossil-fired steam plants was investigated. In the failures of interest, cracks form and propagate in the ferritic steel (usually 2 1/4 Cr-1 Mo steel) about 5 to 15 μm from the fusion lines. The complex microstructure developed at the interface between weld metal and 2 1/4 Cr-1 Mo steel during welding and elevated-temperature service was examined in (1) the as-welded and as-welded-and-tempered conditions, and (2) failed and unfailed joints having more than 100,000 h of service in a fossil-fired boiler. Metallographic observations on failed and unfailed joints were combined with literature observations to explain the interface microstructure and subsequent failure mode. On the basis of the proposed failure model, recommendations are presented for improving joint reliability.

54246 **(BNL-tr—1009) Comparison of the various test methods for studying the hydrogen sensitivity of steels used for storage and transport of hydrogen gas. Final report, June 1, 1980-November 30, 1982.** Barthelemy, H.; Bryselbout, J. (Brookhaven National Lab., Upton, NY (USA)). 1982. Contract AC02-76CH00016. Translation source information not available . 169p. NTIS, PC A08/MF A01. Order Number DE83017201.

Portions are illegible in microfiche products.

Dynamic rupture and fatigue tests were conducted on twenty-five chrome-moly low alloyed steels. The dynamic rupture tests allow us to classify the hydrogen behavior of hydrogen pressure vessel materials with a high sensitivity and an excellent reproducibility. Moreover, a threshold index for hydrogen materials has been defined which is a function of the maximum wall stress. Embrittlement indices increase as the u.t.s. of the steels increase but pressure vessels with thick walls seem to be more susceptible to hydrogen than those with thin walls. Results of the fatigue test indicate that hydrogen considerably affects the number of cycles to crack initiation and to rupture. Correlations are now available between disk fatigue tests and real hydrogen pressure vessel fatigue tests. It is also possible to relate disk fatigue test data to fracture mechanics data. Theory shows that the good hydrogen behavior of a pressure vessel material is mainly due to a lack of reversible traps (detrimental traps) than to a higher number of irreversible traps (good traps). Increasing the irreversible traps number could be a way to improve the hydrogen behavior of such materials. The disk rupture test can be used as a screening test to select materials for hydrogen vessels. When hydrogen fatigue phenomena are supposed to occur, it is necessary to carry out disk fatigue tests to determine the critical number of cycles leading to crack initiation or to rupture.

54247 **Thermodynamics of carbon in Ni-C alloys from 900 to 1215°C.** Bradley, D.J. (Montana College of Mineral Science and Tech., Butte, MT); Leitnaker, J.M.; Horne, F.H. *High Temperature Science;* **15**: 187-198(1982). Contract W-7405-ENG-26.

The activity coefficient of carbon in nickel has been measured at 900, 1100, and 1215°C using the equilibrium $CH_4(g) = C(ss) + 2H_2(g)$. The activity coefficient is found to obey Henry's law up to the concentration investigated. Equations are presented for the partial molar mixing functions of carbon. The results are compared critically with those of earlier investigators.

54248 **Shortcoming of the explicit solution for the binary alloy solidification problem.** Wilson, D.G.; Solomon, A.D.; Alexiades, V. (Oak Ridge National Lab., TN). *Letters in Heat and Mass Transfer;* **9**: No. 5, 421-428(1982).

It is shown that in certain cases the explicit similarity solution for the binary alloy solidification problem exhibits an artificial mushy zone. Although this solution satisfies all of the explicit mathematical conditions of the problem, there can exist a region just in front of the solid/liquid interface where the temperature and concentration it defines lie in the region between the solidus and liquidus curves. A numerical example is given which shows the mushy region, and a condition on the data is derived whose satisfaction will guarantee its occurrence. The anomaly is interpreted to be a shortcoming of the mathematical formulation, which does not explicitly state all of the assumptions.

54249 **Refractory-metal stabilized amorphous stainless steel. Part 1. Formation and stability of amorphous stainless steel with W or Ti.** Wang, R. (Pacific Northwest Lab., Richland, WA). *Journal of Materials Science;* **17**: 1142-1148(1982). Contract AC06-76RL01830.

Commercial stainless steel alloys have been made into amorphous, or glassy, states by adding nearly 10 at. % of refractory metals, such as W or Ti, via high-rate sputter deposition. The formation of these stable amorphous stainless steel alloys required alloy compositions beyond the equilibrium bcc solid solution phase field. For the amorphous alloys containing W, the crystallization temperature increased from 760 to 1035 K as the W content was increased from 11 W to 23 at. % W. The high crystallization temperatures were attributed to the high resistence to crystallization of the complex intermediate chi and μ phases, which occurred at 11 and 23 at. % W respectively.

54250 **Computer simulation of the vacancy-wind effect in a concentrated alloy with long- and short-range order.** Murch, G.E. (Argonne National Lab., IL). *Philosophical Magazine, [Part] A: Defects and Mechanical Properties;* **46**: No. 4, 575-582(1982). Contract W-31-109-ENG-38.

Diffusion via the agency of vacancies in an s.c. binary alloy with long- and short-range order has been simulated using a Monte Carlo method. Results for the vacancy-wind factor occurring in the Darken relation connecting the intrinsic diffusivity, the tracer diffusivity and the thermodynamic factor were collected over the entire composition range at six temperatures. The results obtained are in excellent agreement with Manning's expression, which is exact for the random alloy, substituted with previously obtained computer-simulated values of the tracer diffusivities.

54251 **Volume effects in transition metal alloying.** Watson, R.E. (Brookhaven National Lab., Upton, NY); Bennett, L.H. *Acta Metallurgica;* **30**: 1941-1955(1982). Contract AC02-76CH00016.

The relatively modest volume contractions (or expansions) occurring on alloying of transition metals do not correlate well with the heats of formation. In this work, a useful, numerically accurate, correlation is obtained for equiatomic alloys with an atomic scale, phi, that resembles a Gordy electronegativity. These volume effects display a trend in chemical bonding. Alloys involving manganese, due to its magnetism, and the light lanthanides, due to their special chemical bonding, deviate from the main trend. Alloys off 50/50 display strikingly similar effects, though they must be discussed with a somewhat different phi scale. Transition metal alloying with alkalis and alkaline earths show volume trends suggesting a smooth variation in chemical bonding from the alkalis to the noble metals. In contrast, transition metal alloying with Zn, Cd and Hg indicate a marked break in bonding behavior. The volume effects are strikingly independent of crystal structure. However, the structures assumed by various systems occupy well defined regions on a map, where the difference in phi is one coordinate and the average d-band electron vacancy is the other.

3602 Ceramics, Cermets, And Refractories

REFER ALSO TO CITATION(S) 53670, 54019

54252 **(AD-A—128486/8) Measurement of high mobilities and strain confinement of long-lived free excitons in Cu20. Interim scientific report.** Wolfe, J.P. (Illinois Univ., Urbana (USA). Dept. of Physics). 10 Jan 1983. 14p. NTIS, PC A02/MF A01.

One of the long range goals of this project has been to produce a photoexcited exciton system which displays quantum statistics. A method is made to produce excitons in a superconducting or superfluid state. One of the prime difficulties in achieving this goal is that excitons in direct gap semiconductors generally have very short lifetimes, of order 1 nanosecond, which is not long enough to permit their kinetic energies to come into equilibrium with the lattice temperature. On the other hand, the direct gap semiconductor exhibits excitons with very small Bohr radii advantageous to observing quantum statistics. to circumvent the lifetime problem stated above, high purity crystals of Cu20, which recently were shown to display excitonic lifetimes in the microsecond range. Have been studied.

54253 **(DOE/ER/01198—1394) Phonon dispersion of transverse basal-plane modes in alkali-graphite compounds.** Kamitakahara, W.A.; Zabel, H.; Nicklow, R.M. (Ames Lab., IA (USA); Illinois Univ., Urbana (USA). Dept. of Physics; Oak Ridge National Lab., TN (USA)). 1982. Contract AC02-76ER01198. 6p. (CONF-821185—2). NTIS, PC A02/MF A01. Order Number DE83003910.

From Materials Research Society annual meeting; Boston, MA, USA (16 Nov 1982).

Portions are illegible in microfiche products.

Dispersion curves for low-frequency transverse modes propagating in the basal plane have been measured in the compounds KC_8, KC_{24} and RbC_{24} by means of neutron inelastic scattering. The acoustic branches show at low q a behavior $\omega^2 = Aq^2 + Bq^4$ characteristic of layered materials. The optical branches are derived qualitatively from graphite-like optical branches hybridized with new alkali-like branches. In stage 2 compounds, the shear constant C_{44}, which can be obtained by extrapolating the acoustic branch towards $q = 0$, is appreciably smaller than in stage-1 compounds or in pure graphite. At low temperatures, it was noted in KC_{24} that a frequency gap in the acoustic branch opens up near $q = 0.6\ A^{-1}$, corresponding to the Brillouin-zone boundary of the low-temperature alkali superstructure.

54254 **(DOE/ER/10591—T1) Mechanisms of elevated-temperature rupture in single-phase ceramics. Progress report, February 1, 1983-January 31, 1984.** Solomon, A.A. (Purdue Univ., Lafayette, IN (USA). School of Nuclear Engineering). Sep 1983. Contract AC02-80ER10591. 109p. (COO—10591-4). NTIS, PC A06/MF A01. Order Number DE83017779.

An analytical study was undertaken to determine the importance of pore size distributions, assuming the basic mechanism of pore growth or shrinkage occurs by diffusive mass transport. Results show that the total driving force dominates the dimensional changes. Small pores tend to sinter and large pores swell. The effect of surface tension was theoreticaly included in nonequilibrium pore growth models, but shown to be generally unimportant in this growth mode. A second area of investigation was pore growth in UO_2. Both internal gas pressure, and tensile creep tests were used to study pore growth under different driving forces and states of stress. Both investigations have shown driving force dependencies, DF/sup n/. with n somewhat greater than one. The sectioning techniques developed has permitted pore/grain boundary dihedral angles to be accurately measured and amount of pore growth. No pore sharpening was observed. The tensile creep study of ultra-high purity CoO has also continued. The hot-pressing of UO_2 is also being investigated to amplify previous results for stoichiometric UO_2. In addition, we have pursued an interesting anomaly first discovered during the investigation of swelling in Ni: specimens sintered under low pressure have large grains and intragranular porosity, whereas specimens sintered at high ambient gas pressure yields small grains and pressure yields small grains and intergranular porosity.

54255 **(DOE/ER/10591—T2) Swelling and gas release of grain-boundary pores in uranium dioxide.** Schrire, D.I. (Purdue Univ., Lafayette, IN (USA)). Dec 1983. Contract AC02-80ER10591. 109p. NTIS, PC A06/MF A01. Order Number DE83018250.

Portions are illegible in microfiche products; Thesis.

The swelling and gas release of overpressured grain boundary pores is sintered unirradiated uranium dioxide were investigated under isothermal conditions. The pores became overpressured when the ambient pressure was reduced, and the excess pressure driving force caused growth and interconnection of the pores, leading to eventual gas release. Swelling was measured continuously by a linear variable differential transformer, and open and closed porosity fractions were determined after the tests by immersion density and quantitative microscopy measurements. The sinter porosity consisted of pores situated on grain faces, grain edges, and grain corners. Isolated pores maintained their equilibrium shape while growing, without any measurable change in dihedral angle. Interconnection occurred predominantly along grain edges, without any evidence of pore sharpening or crack propagation at low driving forces. Extensive open porosity occurred at a threshold density of about 85% TD. There was an almost linear dependence of the initial swelling rate on the driving force, with an activation energy of 200+- 8 kJ/mole, in good agreement with published values of the activation energy for grain boundary diffusion.

54256 **(IS-M—429) Electrical conductivities of polycrystalline and single-crystal Er_2O_3-stabilized hafnia.** Jordan, G.W.; Berard, M.F. (Ames Lab., IA (USA)). 1983. Contract W-7405-ENG-82. 21p. (CONF-830451—24). NTIS, PC A02/MF A01. Order Number DE83017681.

From American Ceramic Society annual meeting; Chicago, IL, USA (25 Apr 1983).

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Erbia-stabilized hafnia is an electrolytic conductor. The bulk electrical conductivities determined from complex impedance analysis of data for polycrystalline specimens is the same as that measured for single crystals, and they are independent of P/sub O_2/ below 1 atm and 1070°C. The effects of surface finish, aspect ratio, and porosity of the (high sintered density) specimens is negligible. The electrical conductivity generally decreases and the activation energy for ionic conduction generally increases as the dopant level increases, although plateaus are observed over the composition range 20 to 35 mol% Er_2O_3.

54257 (LBL—14588) Role of microstructural inhomogeneities on high-temperature failure in ceramics. Johnson, S.M. (Lawrence Berkeley Lab., CA (USA)). Sep 1982. Contract AC03-76SF00098. 116p. NTIS, PC A06/MF A01. Order Number DE83017838.

Thesis.

Inhomogeneous regions such as zones of atypical grain size, poorly sintered areas and inclusions have been observed to be crack initiation sites and thus failure origins. An analysis of the stresses associated with microstructurally inhomogeneous regions in a creeping ceramic polycrystal indicates that the stress within such regions and in the peripheral matrix is enhanced by a factor of two. Creep rupture experiments performed on a fine grained (1 to 3 μm) alumina indicated that the failure time, t/sub f/, is proportional to the applied stress, σ/sub ∞/, as t/sub f/ proportional to σ/sub ∞$^{-5}$. The experimental data can be most easily reconciled with crack propagation models. Cavity morphology was observed by the use of high resolution scanning electron microscopy and was found to be dependent on the applied stress. Triple point cavities predominated at high stresses, many closely spaced arrays of two grain boundary cavities predominated at intermediate stresses, and more widely spaced arrays at low stresses. Calculated cavity nucleation stresses are higher than the applied stress, even when locally enhanced by inhomogeneities, and it is postulated that grain boundary sliding transients at wavy grain boundaries may enhance local stresses to the level of the critical nucleation stress. 47 figures.

54258 (LBL—16031, pp 163-168) Radiation damage in ceramics: the influence of grain boundaries. Mitchell, T.E. (Case Western Reserve Univ., Cleveland, OH); Youngman, R.A. 1983. NTIS, PC A19/MF A01. (CONF-830819—). Contract AC02-76ER02119.

From 7. international conference on high voltage microscopy; Berkeley, CA, USA (16 Aug 1983).

Both single crystal and polycrystalline ceramics have been irradiated with neutrons and electrons at high temperatures. Grain boundaries are observed to have an important influence on the microstructure and resulting properties. For example, void and loop alignment leads to anisotropic swelling and cracking along grain boundaries in Al_2O_3; denuded zones are observed in β-Si_3N_4; voids are only observed near the grain boundaries in $MgAl_2O_4$; and in YAG the grain boundary phase (Al_2O_3) is damaged much more heavily than the matrix. This research was supported by the DOE, Contract No. DEAC0276ER02119.

54259 (LBL—16031, pp 169-174) Study of radiation damage in MgO using HVEM. Kinoshita, C.; Kitajima, S.; Hayashi, K. (Kyushu Univ., Fukuoka, Japan). 1983. NTIS, PC A19/MF A01. (CONF-830819—).

From 7. international conference on high voltage microscopy; Berkeley, CA, USA (16 Aug 1983).

The nucleation and growth process of dislocation loops in MgO has been examined during irradiation in an HVEM. The nucleation kinetics implies that the loops nucleate with one or two pairs of Mg- and O-interstitial. The growth kinetics at temperatures above ~ 600°C is analyzed with a model based on the steady state of interstitials and vacancies, yielding the migration energy of vacancies 2.0 +- 0.2 eV. 10 figures.

54260 X-ray photoelectron spectroscopy (XPS) studies of hydrogen reduced rutile (TiO/sub 2-x/) surfaces. Lazarus, M.S. (City Univ. of New York, Bronx); Sham, T.K. *Chemical Physics Letters;* **92**: No. 6, 670-674(12 Nov 1982).

XPS measurements have been made on reduced rutile surfaces under various conditions. It is found that upon exposure to H_2O the amphoteric hydroxyl groups previously detected on the surface of the unreduced TiO_2 are not present in the reduced sample. Results and their consequences are discussed.

54261 Thermal-shock resistant alumina-metal cermet insulators. Morgan, C.S.; Moorhead, A.J.; Lauf, R.J. (Oak Ridge National Lab., TN). *American Ceramic Society Bulletin;* **61**: No. 9, 974-981(Sep 1982). Contract W-7405-ENG-26.

An alumina cermet material that contains 0.5 to 1.5 vol% finely dispersed platinum or chromium was developed for use in high temperature, thermal-shock-resistant electrical insulators. The cermets are produced by hot-pressing Al_2O_3-Pt or Al_2O_3-Cr powders containing finely dispersed metal particles obtained by in-situ reduction of platinum chloride or chromium nitrate. The metal particles increase the thermal-shock resistance by impeding and diverting cracks and by mechanically locking ceramic grains.

54262 Microstructure control for sputter-deposited ZrO_2, ZrO_2 CaO and ZrO_2 Y_2O_3. Pawlewicz, W.T.; Hays, D.D. (Pacific Northwest Lab., Richland, WA). *Thin Solid Films;* **94**: 31-45(1982).

The microstructure of pure and oxide-stabilized cubic ZrO_2 has been determined as a function of the principal deposition conditions for coatings prepared by r.f. diode reactive sputtering. Broad control of crystal structure, phase composition, grain size and crystallographic orientation is obtained by appropriate selection of the target composition, substrate bias and substrate temperature. The crystal structure and phase composition obtained for coatings are compared with predictions based on the equilibrium phase diagrams. The microstructural control demonstrated in this work should make possible rapid, efficient and systematic optimization of ZrO_2 coatings for future engineering applications.

54263 Structure of magnetite (Fe_3O_4) below the Verwey transition temperature. Iizumi, M. (Japan Atomic Energy Research Inst., Tokai); Koetzle, T.F.; Shirane, G.; Chikazumi, S.; Matsui, M.; Todo, S. *Acta Crystallographica, Section B: Structural Crystallography and Crystal Chemistry;* **38**: 2121-2133(1982).

The structure of Fe_3O_4 at 10 K, a temperature below that of the Verwey transition (T/sub v/ ≅ 120 K), has been analyzed with three-dimensional neutron diffraction data. The space group is found to be Cc with a monoclinic unit cell which corresponds to √2a x √2a x 2a of the cubic spinel unit cell (space group Fd3m) found above T/sub v/. The monoclinic cell contains 32 formula units. In order to facilitate analysis of this complicated structure, primitive orthorhombic space groups with pseudosymmetric elements have been adopted as approximations. The displacements of atoms from the cubic positions have been decomposed into distinct displacement patterns with characteristic symmetries, which suggest that the displacements brought about by the phase transition result from the simultaneous condensation of a few phonons.

54264 Climb dissociation of <1010> dislocations in sapphire (α-Al_2O_3). Phillips, D.S. (Univ. of Illinois, Urbana); Cadoz, J.L. *Philosophical Magazine,* [*Part*] *A: Defects and Mechanical Properties;* **46**: No. 4, 583-595(1982). Contract AC02-76ER01198.

<1010> dislocation loops are formed from edge dipoles during the early stages of prismatic slip in sapphire (α-Al_2O_3). These loops are predominantly edge in character and dissociate by climb into triplets of concentric loops with b = 1/3 <1010>. These faulted loops lie on (1120) prismatic planes. As the loops shrink by bulk diffusion, they transform to doubly-dissociated faulted loops and then to single faulted loops. The cation fault produced in all these reactions is identical with that previously reported for the glide dissociation of the <1010> dislocations. The stacking fault energies inferred from the mean radii and extents of dissociation observed are in agreement with the range of those previously reported.

54265 Growth and properties of $Ni_{20.3}Ti_{3.7}B_6$ (tau-phase) crystals. Finch, C.B.; Becher, P.F.; Ferber, M.K.; Tennery, V.J.; Yust, C.S. (Oak Ridge National Lab., TN). *Journal of Crystal Growth;* **58**: 647-649(1982). Contract W-7405-ENG-26.

Single crystals of $Ni_{20.3}Ti_{3.7}B_6$ 1 cm in diameter were grown from the melt by the Czochralski method at 1200 to 1215°C. Growth parameters and crystal properties are characterized.

3604 Polymers And Plastics

REFER ALSO TO CITATION(S) 53544

54266 (AD-A—126999/2) Fracture toughness of polybutadiene at cryogenic temperatures. Technical report. Burford, R.P. (Akron Univ., OH (USA). Inst. of Polymer Science). Apr 1983. 36p. (TR—26). NTIS, PC A03/MF A01.

An estimate of fracture toughness of crosslined polybutadiene rubber at -180 degrees C has been made using the double torsin method. By using suitable specimen dimensions and strain rates, controlled crack propagatin can be achieved, together with a constant compliance to crack length ratio. Strain energy release rated for this polymer, crosslinked with either dicumyl peroxide or sulphur, were found to be an order of magnitude higher than for linear, glassy thermoplastics. Crazing is considered to contribute to the high toughness observed.

54267 (AERE-M—3251) Radiation stability of plastics and rubbers. Hitchon, J.W. (UKAEA Atomic Energy Research Establishment, Harwell. Materials Development Div.). Aug 1982. 8p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703431.

The accompanying bar charts have been prepared from several sources in response to many requests for information on the effect of ionising radiation on organic polymers. The bar charts give some indications of the radiation life of the three main divisions of useful organic polymers; in descending order of radiation stability, thermosets, thermoplastics and rubbers. They are based on change in mechanical properties when the materials are irradiated at room temperature in air and are applicable to β, γ-radiation, x-rays and accelerated electrons.

54268 (LLB-RA—1981-82) Annual progress report 1981-1982. (Laboratoire Leon Brillouin, Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). 1982. 104p. (In French). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83703541.

This progress report deals with the activities of the laboratory in the following fields: incommensurable non periodic structures, transitions by localization in incommensurable and disordered systems, neutron diffraction, liquid and amorphous states (structure and dynamics), electronic structure of alloys, polymers, magnetic excitations, phonons and molecular motions, nuclear pseudomagnetism and antiferromagnetism, high pressures.

3606 Other Materials

REFER ALSO TO CITATION(S) 53652, 53653, 53670, 53672, 53771, 53776, 54214, 54336, 54336, 54771, 55102, 55112

54269 (AD-A—126946/3) Electron scattering from silicon 30. Master's thesis. Bernhardt, G.P. IV. (Air Force Inst. of Tech., Wright-Patterson AFB, OH (USA)). Jan 1983. 63p. NTIS, PC A04/MF A01.

In 1940, the first experiments on electron excitation of nuclei to discrete levels were done by Collins and Waldman. The first theoretical discussions of this inelastic electron scattering were due to Mamasachlisor in 1943 and Snedden and Touschek in 1948. Lyman et al. in 1951, using a betatron, clearly saw effects due to deviations from point Coulomb scattering, thus allowing nuclear sizes to be measured using electron elastic scattering. Since that time, linear accelerators have become the standard source of high-energy electrons for such work. However, due to the limited resolution, an experiment of the type done in this thesis was not possible before the current generation of linear accelerators and spectrometers. The machine used in the 1950's allowed electron scattering with a resolution of delta p/p 3/5x10 and with currents of a few tenths of a microampre. Work done using these machines, although including some excellent work such as that done by Hofstadter was limited to a few nuclei with well-isolated levels due to inability to resolve closely spaced levels.

54270 (AD-A—127031/3) Electronically induced phase transformations. Annual report 1 Oct 81-30 Sep 82. Freeman, A.J. (Northwestern Univ., Evanston, IL (USA). Dept. of Physics and Astronomy). 30 Nov 1982. 9p. NTIS, PC A02/MF A01.

Our recent development of self-consistent local (spin) density energy band approaches have provided a powerful theoretical/computational tool for determining the electronic structure and properties of complex materials. The importance of charge transfer between constituent atom species has been demonstrated as has its inclusion by means of accurate self-consistent solutions. Some examples of areas in which progress has been achieved include: the high field superconductivity in Chevrel phase compounds; the unusual magnetic and superconducting properties of some C15 compounds including a better understanding of their relationship between the electronic, lattice and superconducting properties of these materials; self-consistent energy band calculations including all electrons and all atoms in the 16 atoms per unit cell of the linear chain transition metal trichalcogenide, TaSe3; and a detailed assessment of theoretical determination of the electron phonon coupling parameter in metals and intermetallic compounds.

54271 (AD-A—127229/3) Deep level defects in semiconductors. Final technical report 1 Jul 78-30 Jun 80. Sundaram, S.; Sharma, R.R. (Illinois Univ., Chicago (USA). Dept. of Physics). Jul 1980. 48p. NTIS, PC A03/MF A01.

Using Racah's irreducible tensor operator formalism, a generalized and more refined treatment of the d-electron matrices for transition metal defects in crystals has been given. The resulting Coulomb and exchange interaction matrices have been used to calculate the electronic structures of GaAs:(2+)Cr(2+) and GaAs:Cr(3+) and interpret the optical data on MgF2:Co(2+) and MgF2:Mn(2+). The significance of the new theory is explained. From the photoluminescence and optical absorption data, the crystal field parameters have been derived.

54272 (CERN—82-10) Compilation of radiation damage test data. Pt. 3. Materials used around high-energy accelerators. Beynel, P.; Maier, P.; Schoenbacher, H. (European Organization for Nuclear Research, Geneva (Switzerland)). 4 Nov 1982. 339p. (In English, French). NTIS (US Sales Only), PC A15/MF A01. Order Number DE83702973.

This handbook gives the results of radiation damage tests on various engineering materials and components intended for installation in radiation areas of the CERN high-energy particle accelerators. It complements two previous volumes covering organic cable-insulating materials and thermoplastic and thermosetting resins. The irradiation have been carried out at various radiation sources and the results of the different tests are reported, sometimes illustrated by tables and graphs to show the variation of the measured property with absorbed radiation dose. For each entry, an appreciation of the radiation resistance is given, based on measurement data, indicating the range of damage (moderate to severe) for doses from 10 to 10^9 Gy. Also included are tables, selected from published reports, of general relative radiation effects for several groups of materials, to which there are systematic cross-references in the alphabetical part. This third and last volume contains cross-references to all the materials presented up to now, so that it can be used as a guide to the three volumes.

54273 (IS-M—420) Coexistence of long-range magnetic order and superconductivity: an overview of ternary rare-earth compounds. Shelton, R.N. (Iowa State Univ. of Science and Technology, Ames (USA)). 1983. Contract W-7405-ENG-82. 14p. (CONF-830419—9). NTIS, PC A02/MF A01. Order Number DE83017694.

From 16. rare earth research conference; Tallahassee, FL, USA (18 Apr 1983).

The competition between superconductivity and long-range magnetic order in ternary rare-earth transition-metal compounds occasionally manifests itself in a low-temperature state of coexistent superconductivity and antiferromagnetic order. Purpose of this paper is to tabulate and then analyze collectively the relatively small group of ternary compounds for which this state of coexistence is observed. 2 tables.

54274 (IS-M—450) **Amorphous silicon-carbon films.** Shanks, H.R.; Ward, J.F.; Carlone, C. (Ames Lab., IA (USA)). 1983. Contract W-7405-ENG-82. 4p. (CONF-830895—7). NTIS, PC A02/MF A01. Order Number DE83018077.

From 10. international conference on amorphous and liquid semiconductors; Tokyo, Japan (22 Aug 1983).

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Thin films of amorphous silicon-carbon-hydrogen were prepared by reactive rf sputtering in an argon-propane atmosphere. AES and NMR were used to determine the film composition. IR measurements show that the SiH stretching mode at 2087 cm^{-1} is present in addition to an admixture of the Si-CH_3 wagging mode near 780 cm^{-1}; and the Si-C stretching mode at $\sim$ 700 cm^{-1}. Optical density measurements were used to determine that the optical gap energy appears to vary between 2.0 and 2.2 eV. A series of isochronal annealing steps were performed on the aSiC:H films and the changes in hydrogen bonding and optical gap energy are observed. Photoluminescence measurements have also been made on the aSiC:H films.

54275 (IS-M—453) **Piston-displacement equations of state for sodium, potassium, and rubidium metals to 20 kbar from 300 K to 4 K.** Swenson, C.A.; Anderson, M.S. (Ames Lab., IA (USA); Iowa State Univ. of Science and Technology, Ames (USA). Dept. of Physics). 1983. Contract W-7405-ENG-82. 4p. (CONF-830763—15). NTIS, PC A02/MF A01. Order Number DE83018079.

From 9. AIRAPT conference; Albany, NY, USA (25 Jul 1983).

Portions are illegible in microfiche products.

We recently have completed a systematic study of the equations of state of sodium, potassium and rubidium metals to 20 kbar at temperatures to 4 K, and summarize in the following some of the general features of these results. This summary will be presented in terms of the Rb results, since comparable data for this metal have not been available previously, and considerable similarities exist between the equations of state of these three metals.

54276 (IS-M—454) **Equations of state for the alkali metals, with generalizations to NaCl.** Swenson, C.A.; Anderson, M.S. (Ames Lab., IA (USA)). 1983. Contract W-7405-ENG-82. 4p. (CONF-830719—51). NTIS, PC A02/MF A01. Order Number DE83018075.

From American Physical Society meeting on shock waves in condensed media; Santa Fe, NM, USA (18 Jul 1983).

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Our recent 20 kbar P-V-T data for the alkali metals cover a wide range of relative pressures and temperatures and are sufficiently accurate to provide guidelines for testing empirical equation of state relations. Data for rubidium, as typical for these metals, are presented in terms of a modification of the ME-2 relation, the MME, at room temperature, and thermal pressures for the other isotherms. These ideas are shown to apply to previous NaCl data to 30 kbar and from 20°C to 500°C. A generalization of the MME is applied to the 25°C shock-wave isotherm for NaCl to 250 kbar to obtain a representation which is consistent with existing high quality P-V data for NaCl at room temperature.

54277 (IS-M—457) **Phonon density of states of amorphous silicon.** Shanks, H.R.; Kamitakahara, W.A.; McClelland, J.F.; Carlone, C. (Ames Lab., IA (USA)). 1983. Contract W-7405-ENG-82. 4p. (CONF-830895—6). NTIS, PC A02/MF A01. Order Number DE83018090.

From 10. international conference on amorphous and liquid semiconductors; Tokyo, Japan (22 Aug 1983).

Inelastic neutron scattering, Raman spectroscopy and infrared absorption measurements have been used to obtain the vibrational spectra for two large (5 gm) sputtered samples of pure and 12% hydrogen doped samples of amorphous silicon. The Si-H wagging mode at 640 cm^{-1} is observed in both neutron scattering and infrared data with similar peak shapes. The mode at 480 cm^{-1} corresponding to the TO (520 cm^{-1}) mode in crystalline silicon is observed in all three measurements independent of hydrogen concentration. A significant spectral density is observed in the neutron scattering data in the Si mode region from 480 cm^{-1} down. Of particular interest is a feature near 200 cm^{-1} which appears in the hydrogen doped samples in both neutron scattering and infrared data. For the first time, results from all three types of measurements are reported on the same samples.

54278 (LBL—16031, pp 31-34) **High voltage high resolution electron microscopy of compound semiconductors.** Smith, D.J. (Univ. of Cambridge, England); Ponce, F.A.; Yamashita, T.; Sinclair, R. 1983. NTIS, PC A19/MF A01. (CONF-830819—).

From 7. international conference on high voltage microscopy; Berkeley, CA, USA (16 Aug 1983).

Several II-VI compound semiconductors have been observed with a 500kV high resolution electron microscope. The lattice defects occurring in ZnTe and ZnSe are described and compared with those found in CdTe.

54279 (LBL—16031, pp 175-180) **In-situ high resolution observation of electron irradiation defects in Si.** Hiraga, K.; Hirabayashi, M. (Tohoku Univ., Sendai, Japan). 1983. NTIS, PC A19/MF A01. (CONF-830819—).

From 7. international conference on high voltage microscopy; Berkeley, CA, USA (16 Aug 1983).

In-situ high resolution observations of the formation of defects in silicon single crystals during electron irradiation were carried out at room temperature using a 1 MV electron microscope. Interstitial loops lying on (311) planes appear first at the expansion sides of dislocations which are introduced by plastic deformation before the observation. These loops extinct with increasing the irradiation dose. In contrast, a number of loops are formed uniformly in the matrix after an incubation time, and grow up to about 30 nm in length after irradiation of about 3 x 10^{23} electrons per cm^2.

54280 (LBL—16031, pp 193-198) **Electron radiation damage in silicate glasses.** DeNatale, J.F.; Howitt, D.G. (Univ. of California, Davis). 1983. NTIS, PC A19/MF A01. (CONF-830819—).

From 7. international conference on high voltage microscopy; Berkeley, CA, USA (16 Aug 1983).

Electron radiation damage in silicate glasses has been studied in-situ using HVEM. The damage is evident from the formation of oxygen bubbles and as an amorphous phase decomposition. The bubble formation if consistent with a mechanism involving the fragmentation of oxide bonds and subsequent oxygen stabilization by a cation migration process. The bond fragmentation mechanism appears to be predominantly from ionization. Bubble regression in the presence of phase separation has been observed and is consistent with enhanced oxygen diffusivity through the high silica phase.

54281 (SAND—83-0194C) **Alkali depletion and ion-beam mixing in glasses.** Arnold, G.W. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 20p. (CONF-830573—7). NTIS, PC A02/MF A01. Order Number DE83017485.

From 2. international conference on radiation effects in insulators; Albuquerque, NM, USA (30 May 1983).

Ion-implantation-induced alkali depletion in simple alkali-silicate glasses ($12M_2O.88SiO_2$) has been studied for implantations at room temperature and near 77K. Results are consistent with a mechanism for alkali removal, by heavy ion bombardment, based on radiation-enhanced migration and preferential removal of alkali from the outermost layers. Similar results were obtained for mixed-alkali glasses ($(12-x)Cs_2O.xM_2O.88SiO_2$) where, in addition, a mixed-alkali effect may also be operative. Some preliminary experiments with ion implantation through thin Al films on SiO_2 glass and on a phosphate glass show that inter-diffusion takes place and suggest that this ion-mixing technique may be a useful method for altering the physical properties of glass surfaces.

54282 **Damage ingrowth and recovery in alpha-irradiated CaF_2, SrF_2, and BaF_2.** Weber, W.J. (Pacific Northwest Lab., Richland, WA (USA)). *Radiation Effects;* 70: No. 1-4, 217-230(Mar 1983).

Single crystals of CaF_2, SrF_2, and BaF_2 were irradiated at room temperature with alpha particles emitted from an effectively semi-infinite $^{238}PuO_2$ source to a cumulative dose of 3×10^{20} alpha particles/m^2. Although no change in the lattice parameter of CaF_2 was observed, the crystals exhibited increasing coloration with dose. The lattice parameters of both SrF_2 and BaF_2 increased exponentially with dose, in agreement with a previously developed model, but the crystals developed no apparent coloration. Isochronal and isothermal-step annealing were used to study the recovery behavior of the lattice defects in both the SrF_2 and BaF_2 single crystals. A single recovery stage, tentatively associated with cation defects, was observed in each and the activation energy determined.

54283 **Characterization of excimer laser annealing of ion implanted Si.** Young, R.T. (Oak Ridge National Lab., TN); van deer Leeden, G.A.; Narayan, J.; Christie, W.H.; Wood, R.F.; Rothe, D.E.; Levatter, J.I. *Electron Device Letters;* **EDL-3**: No. 10, 280-283(Oct 1982). Contract W-7405-ENG-26.

An evaluation of a XeCl excimer laser for the laser processing of Si is reported. The annealing quality of ion-implantation damage, as measured by the crystalline perfection of the regrown layer and by p-n junction characteristics, is similar to that obtained with ruby or Nd:YAG lasers. However, the wide energy window between annealing and surface damage, the flat smooth surface obtained after laser irradiation, the capability of providing deep surface melting, and other features, indicate that XeCl and perhaps other excimer lasers is nearly ideal for semiconductor processing.

54284 **Magnesium-phosphate-glass cements with ceramic-type properties.** Sugama, T.; Kukacka, L.E. US Patent Application 6-422,510. 23 Sep 1982. 25p. Contract AC02-76CH00016.

Rapid setting magnesium phosphate (Mg glass) cementitious materials consisting of magnesium phosphate cement paste, polyborax and water-saturated aggregate, exhibits rapid setting and high early strength characteristics. The magnesium glass cement is prepared from a cation-leachable powder and a bivalent metallic ion-accepting liquid such as an aqueous solution of diammonium phosphate and ammonium polyphosphate. The cation-leachable powder includes a mixture of two different magnesium oxide powders processed and sized differently which when mixed with the bivalent metallic ion-accepting liquid provides the magnesium glass cement consisting primarily of magnesium ortho phosphate tetrahydrate, with magnesium hydroxide and magnesium ammonium phosphate hexahydrate also present. The polyborax serves as a set-retarder. The resulting magnesium mono- and polyphosphate cements are particularly suitable for use as a cementing matrix in rapid repair systems for deteriorated concrete structures as well as construction materials and surface coatings for fireproof structures.

54285 **Free-standing polycrystalline boron phosphide film and method for production thereof.** Baughman, R.J.; Ginley, D.S. US Patent Application 6-416,409. 9 Sep 1982. 13p. Contract AC04-76DP00789.

A process for producing a free-standing polycrystalline boron phosphide film comprises growing a film of boron phosphide in a vertical growth apparatus on a metal substrate. The metal substrate has a coefficient of thermal expansion sufficiently different from that of boron phosphide that the film separates cleanly from the substrate upon cooling thereof, and the substrate is preferably titanium. The invention also comprises a free-standing polycrystalline boron phosphide film for use in electronic device fabrication.

54286 **Electronic states of (2 x 1) and (1 x 1) (111) surfaces of Ge, Si diamond, GaAs and Ge on Si.** Buisson, J.P. (Univ. of Illinois, Urbana); Dow, J.D.; Allen, R.E. *Surface Science;* **120**: No. 2, L477-L482(Aug 1982). Contract AC02-76ER01198.

The dangling-bond surface state dispersion curves, E(k), have been calculated for the (2 x 1) and (1 x 1) (111) surfaces of Ge, Si, and diamond, for (1 x 1) GaAs, and for (2 x 1) Ge on Si. The calculations employ the sp^3s empirical tight-binding model of Vogl et al. and the atomic relaxation of Feder et al. The surface state band gaps are in good agreement with optical-absorption and electron-energy-loss measurements for Ge and Si. For the assumed epitaxial geometry, Ge and Si is predicted to shift the dangling-bond states downward by $\simeq$ 0.1 to 0.4 eV.

54287 **Additional observations on the ferric ion (Fe^{3+}) content of melt-grown fayalite (Fe_2SiO_4).** Kopp, O.C.; Abraham, M.M. (Oak Ridge National Lab., TN). *American Mineralogist;* **67**: 349(Mar-Apr 1982). Contract W-7405-ENG-26.

Results have been received for a high-sensitivity Moessbauer study with a threshold of ferric ion (Fe^{3+}) at .27 wt %. The fayalite crystals single-phase character and freedom from magnetic inclusions had been verified petrographically. The analysis did not indicate the presence of Fe^{3+}, thus confirming that fayalite grown at a pressure of 10^{-12} bar of oxygen contains less than 0.27 wt % Fe at 77K. Previously determined high solution colorimetry results might be due to a reversible increase of Fe^{3+}/ferrous (Fe^{2+}) ratio between 77K and 295K, but more likely are due to the oxidation of Fe^{2+} to Fe^{+} during analysis. Conclusions suggest a high bias of solution colorimetry results at low Fe^{3+}/Fe^{2+} ratios.

54288 **Magnetism and crystal fields in ternary superconductors.** Shenoy, G.K.; Crabtree, G.W.; Niarchos, D.; Behroozi, F.; Dunlap, B.D.; Hinks, D.; Noakes, D.R. (Argonne National Lab., IL). pp 431-441 of Crystalline electric field effects in f-electron magnetism. Guertin, R.P.; Suski; Zolnierek (eds.). New York, NY; Plenum Publishing Corporation (1982).

In this paper, the present state of knowledge of crystalline electric field (CEF) in two important classes of ternary superconductors has been described. It is clear that in understanding the superconducting and magnetic behavior of $RERh_4B_4$, the CEF plays a very important role. Considerable importance has been given to the specific heat Schottky anomalies in deducing the position and degeneracy of various CEF levels. Interpretation of these data is made difficult because of complicated subtraction of lattice, electronic and superconducting specific heats. Furthermore, the purity of the sample is important in such studies. It is known that a few percent of Rh-B/sub x/, $RERh_3B_2$ and $RERh_6B_4$ are commonly present in $RERh_4B_4$, while Mo-Ch/sub x/, RE-Ch/sub x/ and RE_2O_2Ch phases occur in Chevrel phase compounds. Only single-crystal samples will lead to dependable specific heat data.

54289 **Development of morphological instability and formation of cells in silicon alloys during pulsed laser irradiation.** Narayan, J. (Oak Ridge National Lab., TN). *Journal of Crystal Growth;* **59**: 583-598(1982). Contract W-7405-ENG-26.

The details of morphological instabilities occurring during rapid solidification have been studied in In^+, Sb^+, Ga^+ and Bi^+ implanted silicon after pulsed laser annealing. Interfacial instability results in lateral segregation of impurities, which leads to the formation of cellular structures. The average cell sizes, at the onset of instability (OI) and in the region of well-developed instability (DI), were determined using plan-view and cross-section electron microscopy. Total and substitutional solute concentration profiles were determined using high resolution Rutherford backscattering, ion channeling techniques. The formation of cells and the critical solute concentrations associated with instability were studied as a function of velocity of solidification by varying either the substrate temperature of the laser parametera. Results on the cell formation and the critical solute concentrations were compared with calculations of the perturbation theory in which experimentally deduced values of distribution coefficients and liquidus slopes were used. A good agreement was obtained between the calculations and the experimental results on critical solute concentrations, and between the calculations and the OI cell sizes, which were larger than those in the DI region.

54290 **Effects of monochlorosilane on the properties of plasma deposited hydrogenated amorphous silicon.** Delahoy, A.E.; Griffith, R.W.; Kampas, F.J.; Vanier, P.E. (Brookhaven National Lab., Upton, NY). *Journal of Electronic Materials;* **11**: No. 5, 869-882(1982). Contract AC02-76CH00016.

Concentrations of monochlorosilane (SiH_3Cl) of the order of 2500 ppM have been detected in some commercial tanks of silane

by mass spectrometry and optical emisson spectroscopy (OES). This impurity is shown to depress the position of the Fermi level in a-Si:H, resulting in lower photoconductivity and solar cell efficiency.

40 CHEMISTRY

4001 Analytical And Separations Chemistry

REFER ALSO TO CITATION(S) 53352, 53371, 53371, 53471, 53625, 53625, 53647, 53719, 53722, 53740, 53744, 53783, 54205, 54314, 54314, 54315, 54327, 54330, 54331, 54880, 54880

54291 **(BNL—33597) Algorithm for reconstruction of count-rate curves from total counts.** Rescigno, A.; Lambrecht, R.M. (Brookhaven National Lab., Upton, NY (USA); Yale Univ., New Haven, CT (USA). School of Medicine). 1983. Contract AC02-76CH00016. 10p. (CONF-830794—1). NTIS, PC A02/MF A01. Order Number DE83017343.

From Conference on mathematics in biology and medicine; Bari, Italy (18 Jul 1983).

Dynamic studies with radioactive tracers require measurements of instantaneous tracer activity X(t) as a function of time; this is usually done either with a counter set for a sequence of short intervals of time, or with a ratemeter. Algorithm is computed for finding the count rate from the total count.

54292 **(DOE/ER/05016—5) Separation of selected cations by liquid membranes. Progress report, 1 December 1982-31 August 1983.** Christensen, J.J.; Izatt, R.M. (Brigham Young Univ., Provo, UT (USA)). 31 Aug 1983. Contract AC02-78ER05016. 13p. NTIS, PC A02/MF A01. Order Number DE83017755.

The overall objective of the project is to investigate the use of liquid membrane systems employing macrocyclic ligand carriers in making separations among metal cations. Accomplishment of this objective involves defining the features of the membrane system which determine the magnitude of the cation flux and relating those features in as quantitative a manner as possible to this flux. The experimental data collected have included macrocycle-mediated cation fluxes in bulk liquid membrane systems for alkali cation mixtures, for selected cations where the membrane has been varied using a series of halocarbons, and for Ag^+-K^+ mixtures where the relative Ag^+ and K^+ concentrations have been varied over a wide concentration range. In addition, macrocycle-mediated cation transport has been investigated in an emulsion liquid membrane system using a variety of experimental procedures. A vesicle membrane system has been designed and constructed which allow better control of experimental variables than does the emulsion membrane system. Modeling of all of these liquid membrane systems is being carried out concurrently with the experimental work.

54293 **(IS-M—427) Direct liquid sample introduction into an inductively coupled argon plasma.** Rice, G.W.; Lawrence, K.E.; Fassel, V.A. (Iowa State Univ. of Science and Technology, Ames (USA)). 1983. Contract W-7405-ENG-82. 2p. (CONF-830388—1). NTIS, PC A02/MF A01. Order Number DE83017676.

From Conference on analytical chemistry and applied spectroscopy; Atlantic City, NJ, USA (6 Mar 1983).

A micro concentric nebulizer that allows for direct introduction of liquid samples into the ICP is described.

54294 **(IS-M—452) Ultrasensitive optical rotation and refractive-index measurements.** Yeung, E.S. (Ames Lab., IA (USA)). 1983. Contract W-7405-ENG-82. 8p. (CONF-830874—25). NTIS, PC A02/MF A01. Order Number DE83018078.

From 27. annual international technical symposium on high speed photography, videography and photonics; San Diego, CA, USA (21 Aug 1983).

Among the many techniques that benefited from the development of laser technology, two examples are the improved detectability in optical rotation and in refractive index measurements. In conjunction with liquid chromotography, one can take advantage of the improved detectability to study molecules that are present in small quantities in fairly complex samples, such as biological fluids and fossil fuels. The high degree of collimation of the laser allows better levels of extinction to be achieved between crossed polarizers. The amount of scattered light, and thus the amount of depolarization, can be greatly reduced. This then allows small rotations of the polarization axis of light to be detected. A detectability of 1.5 x 10^{-8} degrees can be achieved. The high monochromaticity of the laser brings about new applications of Fabry-Perot interferometry. The interference fringes can be used to monitor refractive index changes inside the interferometer. In conjunction with a flow cell interfaced to a liquid chromatograph, a detectability of 4 x 10^{-9} RI units is possible.

54295 **(OAEP—92) Preliminary investigation of radiation level and some radionuclides in imported food and food products.** Sinakhom, F.; Mongkolphantha, S. (Office of Atomic Energy for Peace, Bangkok (Thailand)). Apr 1980. 27p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83702965.

A preliminary study of gross beta activity and content of some long-lived radionuclides associated with fission products in various types of imported food and food-products was carried out. Food samples were purchased monthly during 1976-1977 from general well-known supermarkets and local grocery stores up to a total of 89 samples. The gamma spectrum of long-lived radionuclides was searched using a 128 channel analyzer coupled with 3" x 3" NaI (T1) crystal detector. Two radionuclides were frequently found to be present in these food samples, viz. potassium-40 and cesium-137 and their concentrations were subsequently determined. The limits of detection under the conditions used for potassium-40 and cesium-137 were 0.04 and 0.03 pCi/g-wet weight, respectively. Samples were dry-ashed and counted for gross beta activity utilizing a low background anti-coincidence G.M. counter. The content of strontium-90 was also investigated concurrently by solvent extraction technique employing tri-n-butyl phosphate as an extractant. Results of the study are tabulated.

54296 **(OAEP—93) Development of an analytical technique for the determination of traces of mercury by substoichiometric isotope dilution method.** Jingjit, M.; Mongkolphantha, S. (Office of Atomic Energy for Peace, Bangkok (Thailand)). Sep 1980. 42p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83702966.

A procedure has been developed for the quantitative determination of traces of mercury in biological samples. The radiochemical separation method used involves the combustion of samples in an oxygen flask, followed by a substoichiometric isotope dilution method utilizing a solvent extraction technique. The method was primarily tested using radiotracer experiments and then by analyzing two already certified NBS Standard Reference Materials, Orchard Leaves and Bovine Liver, and a Bowen's Standard Kale Sample. The limit of detection is 0.005 ppm. The technique developed is comparatively simple, inexpensive, fast and suitable for routine work.

54297 **(OAEP—94) Development of an analytical technique for the determination of traces of cadmium by substoichiometric isotope dilution technique.** Nouchpramool, S.; Mongkolphantha, S. (Office of Atomic Energy for Peace, Bangkok (Thailand)). Sep 1980. 49p. (In Thai). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83702967.

A procedure has been developed for the quantitative determination of traces of cadmium in biological samples. The radiochemical separation method is a combination of a solvent extraction of cadmium from the sample following by a substoichiometric isotope dilution method utilizing solvent extraction technique. The method was primarily tested using radio-tracer experiments and then by analyzing two already certified Standard Reference Materials and a Bowen Standard Kale Sample. The limit of detection under the conditions used is 0.005 microgram. The technique developed is comparatively simple, inexpensive, fast and suitable for the routine work.

54298 **(OAEP—96) Development of preconcentration techniques for the determination of cadmium, copper, lead and zinc in sea water in conjunction with flame atomic absorption spectrophotometry.** Leenanupan, V.; Sirisena, K.; Chaiyasut, N. (Office of Atomic Energy for Peace, Bangkok (Thailand)). Sep 1981. 29p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83702968.

Cd, Cu, Pb and Zn could be concentrated from sea water by adsorption on a column of chelex-100 at pH 7.6. After elution with 2M HNO_3 the contents of the elements were determined by an atomic absorption spectrophotometer. The adsorption of the 1-pyrrolidine dithiocarbamate complexes of Cd, Cu and Zn on chromosorb W-DMCS was found to be between 80-100%. After elution with chloroform and strip-back with 6M HNO_3 the contents of the elements were determined by an atomic absorption spectrophotometer. The analytical results of 5 samples through the two preconcentration methods agree well with one another.

54299 **(PB—83-226928) Application of Kelgraph to electrochemical detectors for flow injection analysis and high performance liquid chromatography. Technical report.** Weisshaar, D.E. (North Dakota State Univ., Fargo (USA). Dept. of Chemistry). Jan 1983. 88p. NTIS, PC A05/MF A01.

The active area of Kel-F graphite composite (Kelgraf) electrodes determined from short time chronoamperometric data agree well with the weight percent of graphite in the composite and with the percent conducting carbon on the surface determined from x-ray photoelectron spectroscopy (XPS). The performance of Kelgraf as an electrode for electrochemical detection in flowing streams is discussed, including the determination of the optimum electrode composition and the linear dynamic range of the detector. The detector was applied to the determination of phenols in groundwater and coal gasification waste water. Detection limits ranged from 3-15 pg for a variety of phenols. No fouling of the electrode was evident. Evidence based on chronoamperometry, XPS, SEM, cyclic voltammetry and capacitance measurements point to the existence of a partial thin film of Kel-F over portions of the graphite sites. The implications of the presence of such a film are also discussed.

54300 **(PB—83-227397) Removal of radon from water using granular activated carbon adsorption. Annual report.** Lowry, J.D. (Maine Univ., Orono (USA). Land and Water Resources Inst.). Jun 1983. 38p. NTIS, PC A03/MF A01.

A concise summary is presented of the current knowledge on radon removal using granular activated carbon (GAC) treatment. The technical information is based upon laboratory and field research and it is presented in a question-and-answer format. Other pertinent topics discussed and explained include: (1) type of GAC to use, (2) required capacity of GAC unit, (3) shielding considerations for GAC units, (4) effective life of a bed, (5) backwash requirements for GAC units, and (6) cost of GAC treatment.

54301 **(RMCS-R—78005) Ion beam measurements of depth profiles of deuterium concentration in steels. Pt.1: investigation of 18Ni250 high temperature aged martensitic steel.** Grimshaw, J.A. (Royal Military Coll. of Science, Shrivenham (UK)). Nov 1978. 39p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83702969.

An ion beam technique has been used to study the concentration of deuterium as a function of depth in 18Ni250 maraged steel. The technique involves the D(D,P)T reaction induced in samples by a deuteron beam, combined with computer analysis of the energy spectrum of the reaction protons. Measurements of concentrations down to 10 weight parts/million have been achieved, following the introduction of the deuterium into samples by cathodic charging. The concentration profiles were found to possess an initial maximum at a depth of about 2 microns. It is inferred that deuterium migrated both into the bulk and to the surface where it escaped, both during and after cathodic charging.

54302 **(RMCS-R—80001) Ion beam measurements of depth profiles of deuterium concentration in steels. Pt.II: investigation of stainless steel types 304L and EN58E and conclusions of parts I and II.** Grimshaw, J.A. (Royal Military Coll. of Science, Shrivenham (UK)). Jul 1980. 106p. NTIS (US Sales Only), PC A06/MF A01. Order Number DE83702970.

The migrational behaviour of deuterium in the near-surface region of stainless steels has been studied using an ion-beam technique. The results have relevance to the problem of hydrogen embrittlement, since the deuterium was loaded into the steels by cathodic charging, which when prolonged induced surface cracks. Measurements were made of the concentration profiles of the deuterium from the surface down to a depth approaching 10μm, most of the deuterium being found to reside in this region in 304L steel.

54303 **(Y/DK—357) Contribution to ASTM C-26.05 Task Group: determination of impurities in uranium by ICP-AES after separation with TBP.** Larson, G.F.; Slagle, R.E. (Oak Ridge Y-12 Plant, TN (USA)). 13 Jul 1983. Contract W-7405-ENG-26. 13p. (CONF-830747—1). NTIS, PC A02/MF A01. Order Number DE83017867.

From ASTM Committee C-26 on nuclear fuel cycle; Quebec, Canada (11 Jul 1983).

Uranium metal or uranium oxide is dissolved in nitric acid. Hydrofluoric acid is added to insure complete dissolution of HF, NB, SI, SN, TA, W, and ZR. The uranium is separated from the impurity elements using a tributyl phosphate and carbon tetrachloride solution. The aqueous phase containing the impurity elements is aspirated into the inductively coupled plasma. The concentrations of the impurity elements are measured by emission spectroscopy.

54304 **Method for quantitative determination and separation of trace amounts of chemical elements in the presence of large quantities of other elements having the same atomic mass.** Miller, C.M.; Nogar, N.S. US Patent Application 6-414,192. 2 Sep 1982. 22p. Contract W-7405-ENG-36.

Photoionization via autoionizing atomic levels combined with conventional mass spectroscopy provides a technique for quantitative analysis of trace quantities of chemical elements in the presence of much larger amounts of other elements with substantially the same atomic mass. Ytterbium samples smaller than 10 ng have been detected using an ArF* excimer laser which provides the atomic ions for a time-of-flight mass spectrometer. Elemental selectivity of greater than 5:1 with respect to lutetium impurity has been obtained. Autoionization via a single photon process permits greater photon utilization efficiency because of its greater absorption cross section than bound-free transitions, while maintaining sufficient spectroscopic structure to allow significant photoionization selectivity between different atomic species. Separation of atomic species from others of substantially the same atomic mass is also described.

54305 **Detection of transient paramagnetic intermediates by time-resolved magnetic resonance and related techniques.** Trifunac, A.D. (Argonne National Lab., IL); Lawler, R.G. *Magnetic Resonance Review;* 7: No. 2, 147-174(1982). Contract W-31-109-ENG-38.

Time-resolved magnetic resonance methods for detection and study of transient paramagnetic intermediates are reviewed. After a brief history of the development of EPR techniques, state-of-the-art time-resolved EPR is illustrated by recent applications of pulsed microwave methods. Two new time-resolved techniques illustrated are NMR detected nuclear resonance in transient radicals and time-resolved fluorescence detected magnetic resonance in liquids. 209 references, 13 figures.

4002 Inorganic And Physical Chemistry

REFER ALSO TO CITATION(S) 54323, 54324, 54326, 54329, 54330, 54331

54306 (DOE/ER/04987—4) Solid-state, surface, and catalytic properties of oxides. Progress report, October 1, 1982-August 31, 1983. Kung, H.H. (Northwestern Univ., Evanston, IL (USA). Dept. of Chemical Engineering). Sep 1983. Contract AC02-78ER04987. 13p. NTIS, PC A02/MF A01. Order Number DE83017465.

Effort has been concentrated in two directions: to elucidate the relationship between surface structure and surface chemical properties, and to investigate the effect of crystallite size. Briefly, by comparing the decomposition reactions of methanol, formaldehyde, and formic acid on the nonpolar and the Zn-polar surfaces of ZnO, it was found that the Zn-polar surface was more metallic-like than the nonpolar surface. On the nonpolar surface, defects always make the surface more reactive. In the study of the crystallite size effect, it was found that the selectivity for butadiene production in the oxidative dehydrogenation of butene on iron oxide increases with decreasing crystallite size, ranging from about 40% for very large crystallites to about 80% for very small crystallites. The non-equilibrium thermodynamics of methanol synthesis from syn-gas was studied.

54307 (DOE/ER/05489—2) Structure and reactivity of heterogeneous surfaces and study of the geometry of surface complexes. Progress report, January 1, 1983-December 31, 1983. Landman, U. (Georgia Inst. of Tech., Atlanta (USA). School of Physics). 1983. Contract AS05-77ER05489. 53p. NTIS MF A01. Order Number DE83017401.

Microfiche only, copy does not permit paper copy reproduction.

Our group has been involved in theoretical studies of surface phenomena and processes, aimed toward increasing our understanding of fundamental processes which govern the properties of material surfaces. Our studies cover a wide spectrum of surface phenomena: surface reactivity, surface crystallography, electronic and vibrational structure, dynamical processes, phase transformations and phase change, the properties of interfaces and investigations of material processing and novel materials preparation techniques. In these investigations we develop and employ analytical and novel numerical, simulation, methods for the study of complex surface phenomena. Our recent surface molecular dynamics studies and simulations of laser annealing phenomena opened new avenues for the investigation of the microscopic dynamics and evolution of equilibrium and non-equilibrium processes at surfaces and interfaces. Progress is reported.

54308 (LBL—16459) Effect of lithium carbonate on the reaction of CaO powders with CO_2. Beruto, D.; Kim, M.G.; Barco, L. (Lawrence Berkeley Lab., CA (USA)). Aug 1983. Contract AC03-76SF00098. 24p. (CONF-8309143—1). NTIS, PC A02/MF A01. Order Number DE83017750.

From 6. international symposium on ceramics; Bologna, Italy (26 Sep 1983).

Reaction between CaO powders and CO_2(g) is often limited by slow diffusion of CO_2 through the $CaCO_3$ product. Additions of Li_2CO_3 are shown to increase the reaction rate. At temperatures near or higher than the Li_2CO_3-$CaCO_3$ eutectic temperature, 935°K, complete reaction of the CaO can be achieved when the heating rate and Li_2CO_3 content are optimized. At lower temperatures Li_2CO_3 causes less but measurable increases in reaction rates. SEM and surface area observations suggest different reaction paths when Li_2CO_3 is present, when Li_2CO_3 and eutectic are present, and when eutectic alone is present.

54309 Photoelectron spectroscopic study of the bonding in tetracarbonyl(ethylene)iron. Beach, D.B.; Jolly, W.L. (Lawrence Berkeley Lab., CA). *Inorganic Chemistry;* **22**: No. 15, 2137-2139(20 Jul 1983). Contract AC03-76SF00098.

The iron 2p/sub 3/2/, carbon 1s, and oxygen 1s binding energies of gaseous tetracarbonyl (ethylene) iron [$Fe(CO)_4C_2H_4$] have been measured. Atomic charge calculations based on binding energy shifts indicate that the ethylene group of [$Fe(CO)_5$] is affected by three equatorial CO ligands; (3) the total back-bonding of the (d/sub xz/, d/sub yz/) orbitals of $Fe(CO)_4C_2H_4$ is less negatively charged. Interpretation of the published UPS spectrum of $Fe(CO)_4C_2H_4$ with the aid of core binding energy shifts leads to the following conclusions: (1) there is significant σ interaction between the ethylene ligand and the $Fe(CO)_4$ group of $Fe(CO)_4C_2H_4$; (2) the energy of the (d/sub xy/, d/sub x^2-y^2/) orbitals of $Fe(CO)_4C_2H_4$ is affected by the two equatorial CO ligands and the ethylene ligand to the same extent as the energy of the (d/sub xy/, d/sub yz/) orbitals of $Fe(CO)_4C_2H_4$ is less than that of $Fe(CO)_5$, as expected from the orthogonality of these orbitals and the π orbital of coordinated C_2H_4 in $Fe(CO)_4C_2H_4$.

54310 Quantum effects of high-frequency modes in inorganic electron transfer: kinetic isotope effects in redox reactions of $[Fe(H_2O)_6]^{2+}$, $[Fe(D_2O)_6]^{2+}$, and $Fe[(^{18}OH_2)_6]^{2+}$. Guarr, T. (Univ. of Rochester, NY); Buhks, E.; McLendon, G. *Journal of the American Chemical Society;* **105**: No. 12, 3763-3767(15 Jun 1983).

Kinetic isotope effects have been measured for redox reactions of the iron hydrates (from the title) with a series of M/sup III/ (bipyridinium)$_3$ oxidants. M = iron III,, ruthenium III, chromium III. The rate ratios $k(^{16}OH_2)/k(^{18}OH_2)$ have been predicted in the literature. Deuterium isotope effect measurements are complicated by the difference of the aqueous iron^{2+}/$^{3+}$ [$Fe(aq)^{2+}$/$^{3+}$] reduction potential in water and heavy water (D_2O): E°/sub Fe^{3+}/H_2O/ - E°/sub Fe^{3+}/D_2O/ = -0.040 V. After correcting the observed rates for the change in reaction driving force, an isotope effect of 1.3 is estimated for the cross reactions involving Fe(aq)$^{2+}$/$^{3+}$ (at ΔE = O). This value is larger than predicted and 20% greater than that observed in the $^{16}OH_2$ vs $^{18}OH_2$ experiments, possibly reflecting a contribution of frozen O-H modes in the reaction coordinate. 4 figures, 2 tables.

54311 Equilibrium shapes of crystals and of cavities in crystals. Searcy, A.W. (Lawrence Berkeley Lab., CA). *Journal of Solid State Chemistry;* **48**: No. 1, 93-99(Jun 1983). Contract AC03-76SF00098.

Surface free energies are assumed to be the sum of the excess free energies of bonding of molecules in or near the surface, and the stable form of a cyrstal or cavity is assumed to be the form that makes the sum of these excess free energies a minimum. When only plane surfaces are allowed, this model predicts the same shapes for crystals as an equation of Wulff which is based on the macroscopic thermodynamic relation of Gibbs. The model predicts rounding of edges and corners of kinds which are not allowed by the Wulff relation and predicts that spherical forms of particles and cavities can be stable despite anistropic surface free energies. The model provides a useful framework for analysis of whether unstable crystal or cavity shapes will evolve into stable or metastable forms. Some crystals and cavities that have been assumed to have equilibrium shapes instead have metastable shapes.

54312 Metal hydride catalysis: water formation on exposure of $LaCo_5H$/sub z/ to O_2. Oesterreicher, H.; Elton, J. (Univ. of California, San Diego, La Jolla). *Journal of Solid State Chemistry;* **48**: No. 1, 128-132(Jun 1983).

The formation of H_2O upon exposure of $LaCo_5H$/sub z/ to O_2 is studied at various temperatures in the vicinity of room temperature. In the equilibrium range of α and β hydride phases a predominantly linear dependence of rate on z (first-order rate law) is observed. Near room temperature no concomitant metal oxidation occurs, as the metal matrix can be rehydrided. The process is therefore a catalytic one. At higher temperatures the predominantly first-order reaction is modified by at least two concurrent reactions. They involve reaction of gas phase hydrogen and partial metal oxidation. Similar reactions of metal hydrides with NO and CO are briefly discussed.

54313 Photoassisted reduction of sulfur dioxide in nonaqueous solutions at p-type semiconductor electrodes. Calabrese, G.S.; Sobieralski, T.J.; Wrighton, M.S. *Inorganic Chemistry;* **22**: No. 11, 1634-1639(25 May 1983).

The electrochemical behavior of SO_2 has been investigated at illuminated (632.8 and 514.5 nm) p-type semiconducting silicon (Si) tungsten sulfide (WS_2), and indium phosphide (InP) in [tetra-n-

butyl ammonium perchlorate n-$Bu_4N]ClO_4$ solutions. SO_2 is photoreducible at each of these materials to form $S_2O_4^{2-}$, but the electrical power savings efficiencies are variable. The best power savings efficiency, ~ 11% at 514.5 nm (100 mW/cm^2), is obtained with a p-type InP photocathode modified by photoelectrodeposition of ~ 5 x 10^{-8} mol/cm^2 of Pt onto the surface. Naked p-InP is considerably less efficient, owing to poor kinetics for the reduction of SO_2. The deposition of platinum (Pt) onto p-InP forms neither a uniform ohmic contract nor a Schottky barrier; rather, studies of platinized n-InP show directly that the Pt serves as a catalyst for SO_2 reduction. Power savings efficiencies for p-type WS_2 and textured Si are low, owing to small output voltages. Preparative, controlled-potential photoelectrochemical reduction of SO_2 at all three photoelectrodes and Pt in CH_3CN/0.1 M SO_2/0.5 M [n-$Bu_4N]ClO_4$ has been demonstrated to give > 90% current efficiency for formation of $S_2O_4^{2-}$, which can be precipitated and collected as $Na_2S_2O_4$.

54314 **Kinetics and mechanism of the oxidation of hexaaquovanadium(II) ions by aliphatic radicals.** Chen, J.T.; Espenson, J.H. *Inorganic Chemistry;* 22: No. 11, 1651-1655(25 May 1983). Contract W-7405-ENG-26.

Hexaaquovanadium(II) [$V(H_2O)_6^{2+}$] is oxidized to vanadium(III) (V^{3+}) by 2-propanol radicals and by ethyl ether radicals with the formation of 2-propanol and ethyl ether. The rate constants were determined by kinetic competition methods based upon the homolytic decomposition of organopentaaquochromium(III) cations. The rate constants for the respective constants are 2.1 x 10^5 and 5.9 x 10^4 $M^{-1}s^{-1}$ (at 25°C, .1 - 1 M hydrogen ion). The mechanisms considered are (1) rate-limiting acidolysis of a seven-coordinate organovanadium species present in steady-state equilibrium with the reactants and (2) abstraction by the aliphatic radical of a hydrogen atom from a water molecule coordinated to vanadium (II). These possibilities are considered in light of data on the oxidation of 2-propanol by cobalt(III) and manganese (III). 1 figure, 2 tables.

54315 **Electron-transfer quenching vs. exciplex-mediated quenching of the low-lying excited states in phthalocyanines.** Prasad, D.R.; Ferraudi, G. *Inorganic Chemistry;* 22: No. 11, 1672-1674(25 May 1983).

Oxidative electron-transfer quenching of the lowest ligand-centered $^3\pi\pi^*$ of ruthenium (RU) phthalocyanines $(pc)L_2$, L = dimethylformamide (dmf) or pyridine (py), by a series of nitroaromatic compounds, viologen salts, and metal complexes has been investigated by laser and conventional flash photolysis. The quenching rate constants, treated according to Marcus-Hush and Rehm-Weller equations, gave self-exchange rate constants, k/sub exch/ ~ 10^7 M^{-1} s^{-1}, for the electron exchange between the $^3\pi\pi^*$ and the ruthenium(II) ligand radical. The excited states of a number of phthalocyanines, e.g. Ru(pc)(dimethyl sulfoxide(Me_2SO)$_2$), Ru(pc)(dmf)CO, Ru(pc)(py)CO, and Rh(pc)(methanol(CH_3OH)chloride), undergo quenching mediated by exciplex formation. The formation of exciplexes is discussed in terms of the related exciplexes of the porphyrins.

54316 **Stirred autoclave apparatus for study of the Fischer-Tropsch synthesis in a slurry bed. 2. Analytical procedures.** Nuff, G.A.; Satterfield, C.N.; Wolf, M.H. (Department of Chemical Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts 02139). *Industrial and Engineering Chemistry Fundamentals;* 22: No. 2, 258-263(May 1983). Contract FG22-81PC40771.

A procedure is presented that provides a detailed quantitative analysis of Fischer-Tropsch product from an iron or a cobalt catalyst including oxygenates and hydrocarbons. Notably hydrogen and water are also determined, so that complete material balances can be obtained on all elements.

54317 **X-ray absorption spectra of ruthenium L edges in $Ru(NH_3)_5Cl_3$.** Sham, T.K. (Brookhaven National Lab., Upton, NY). *Journal of the American Chemical Society;* 105: No. 8, 2269-2273(20 Apr 1983).

X-ray absorption spectra of ruthenium L edges of $[Ru(NH_3)_5]Cl_3$ have been obtained with synchrotron radiation. It is found that Ru L edges exhibit white lines characteristic of ligand-field and spin-orbit effects. Analysis of the data on the basis of local symmetry and the electronic configuration of the complex yields a 10Dq value of 3.93 eV.

54318 **Argonne intense pulsed neutron source used to solve the molecular structure of a novel organometallic complex.** Schultz, A.J. (Argonne National Lab., IL); Teller, R.G.; Beno, M.A.; Williams, J.M.; Brookhart, M.; Lamanna, W.; Humphrey, M.B. *Science (Washington, D.C.);* 220: 197-199(8 Apr 1983). Contract W-31-109-ENG-38.

The single-crystal structure of $Mn(CO)_5(C_7H_{11})$ is the first to be solved by direct methods based on time-of-flight neutron diffraction data obtained at the Argonne Intense Pulsed Neutron Source. The molecule contains an unusual three-center, two-electron manganese-hydrogen-carbon interaction. 2 figures.

54319 **Effects of potassium promotion on the activity and selectivity of iron Fischer-Tropsch catalysts.** Arakawa, H.; Bell, A.T. (Materials and Molecular Research Division, Lawrence Berkeley Laboratory, and Department of Chemical Engineering, University of California, Berkeley, California 94720). *Industrial and Engineering Chemistry Process Design and Development;* 22: No. 1, 97-103(Jan 1983).

A systematic study has been carried out of the effects of potassium promotion on the performance of alumina supported iron catalysts for Fischer-Tropsch synthesis. The results show that potassium promotion causes a decrease in Fe dispersion, an increase in the strength of CO chemisorption on reduced Fe, a decrease in the turnover frequency for total CO consumption, an increase in the average molecular weight and olefi to paraffin ratio of the products, and an increase in the water-gas-shift activity. The addition of potassium is also found to increase the rate of catalyst carburization. This process occurs more rapidly in a mixture of CO and H_2 than in CO alone.

54320 **Transient response of continuous-flow stirred reactors containing heterogeneous systems for catalysis or sorption.** Datta, R.; Croes, B.; Rinker, R.G. (Univ. of California, Santa Barbara). *Chemical Engineering Science;* 38: No. 6, 885-896(1983).

Time domain solutions are presented for the transient response of an isothermal continuous-flow stirred reactors (CFSR) with one-dimensional diffusion and first-order irreversible chemical reaction in catalyst particles or liquid pools of regular geometry and with mass transfer resistance at the fluid-catalyst interface. Three different cases of feed perturbations have been considered, namely, step input, impulse input and the sudden introduction of pellets into the reactor. The solutions have been derived in a general manner, without specifying the particle shape, and are in terms of characteristic functions defined for each of the three particle geometries considered, i.e. slab with sealed edges, cylinder with sealed ends, and sphere. Asymptotic solutions suitable for large Thiele parameters (phi ≧ 3) have also been derived and are particularly convenient when the series solutions converge slowly. Experimental verification of the exact ad asymptotic solutions for a specific case of absorption and diffusion in a liquid pool is presented.

4003 Organic Chemistry

REFER ALSO TO CITATION(S) 53337, 53344, 53740, 54310, 54314, 54315, 54316, 54318, 54319, 54338, 54342

54321 **Ionic hydrogen bond. 2. Intramolecular and partial bonds. Protonation of polyethers, crown ethers, and diketones.** Mautner, M. (National Bureau of Standards, Washington, DC). *Journal of the American Chemical Society;* 105: No. 15, 4906-4911(27 Jul 1983).

Observations are reported of the relationship between molecular structure and intramolecular hydrogen bonding in polyfunctional oxonium ions in terms of enthalpy (ΔH/sub HB/°) and entropy (ΔS/sub HB/) of the internal bond; the thermal stability of the bond as reflected by the bond opening temperature T, the bond weakening factor ΔH/sub BWF/, and the entropy of cyclization per single C-C, C-O, or C-N bond incorporated into the ring ΔS/sub HB/n/. In the smallest compounds the cyclic structure may

only amount to a stabilized cis conformation, while in the largest compounds the hydrogen bond approaches its full intermolecular strength. Combined with previous results, the present data show that intramolecular bonding is prevalent in complex organic ions. 1 figure, 2 tables.

54322 **Ionic hydrogen bond. 3. Multiple NH^+...O and CH/sup δ/+...O bonds. Complexes of ammonium ions with polyethers and crown ethers.** Mautner, M. (National Bureau of Standards, Washington, DC). *Journal of the American Chemical Society;* **105**: No. 15, 4912-4915(27 Jul 1983).

Complexes of ammonium ions RNH_3^+ (R = methyl, c-cyclohexyl), trimethylammonium$^+$ and pyridinium$^+$ with polyethers and crown ethers were observed in the gas phase in the absence of solvent effects. The dissociation energies, ΔH/sub D/° of the RNA_3^+ polyether complexes range from 29.4 kcal/mole (for RNH_3.dimethoxyethane) to 46 kcal/mole (RNH_3^+.18-crown-6). The large ΔH/sub D/° values for complexes of polydentate ligands indicate multiple -NH^+...O- hydrogen bonding. Such multiple bonding can contribute up to 18 kcal/mole to the bonding in RNH_3^+.triethyleneglycol dimethyl ether and 21 kcal/mole in RNH_3^+.18-crown-6. Total ΔH/sub D/° values in the trimethylammonium$^+$.polyether complexes range from 26.7 kcal/mole in trimethyl ammonium$^+$.dimethoxyethane to 41 kcal/mole in trimethylammonium$^+$.18-crown-6. Multiple interaction effects are observed in pyridineum$^+$.polyether complexes. Large negative entropies in RNH_3^+.acyclic polyether complexes vs those of RNH_3^+.cyclic crown ethers make the acyclic polyethers less efficient ligands. 3 figures, 2 tables.

54323 **Regiospecific and stereospecific reactions of $Ph_3C^+ PF_6^-$ with rhenium alkyls (eta-C_5H_5)Re(NO)(PPh_3)(R). α- vs β-hydride abstraction.** Kiel, W.A. (Univ. of California, Los Angeles); Lin, G.Y.; Bodner, G.S.; Gladysz, J.A. *Journal of the American Chemical Society;* **105**: No. 15, 4958-4972(27 Jul 1983).

The regioselectivity and stereochemistry of these reactions are examined. Structures are evaluated with NMR. 4 figures, 4 tables.

54324 **Solid-state NMR studies of the reactions of silica surfaces with polyfunctional chloromethylsilanes and ethoxymethylsilanes.** Sindorf, D.W.; Maciel, G.E. (Colorado State Univ., Fort Collins). *Journal of the American Chemical Society;* **105**: No. 12, 3767-3776(15 Jun 1983). Contract AS20-81LC10652.

The silylation of silica (Si) surfaces by dimethyldichlorosilane, methyltrichlorosilane, dimethyldiethoxysilane, and methyltriethoxysilane has been studied by solid-state ^{29}Si and ^{13}C NMR, by use of cross polarization (CP) and magic-angle spinning (MAS). An earlier formalism for the quantitative analysis of the NRM data has been extended for use with polyfunctional silyating agents and applied in detail to dimethyldichlorosilane reactions. Silylation with ethoxysilane reagents is less amenable to quantitative interpretation but appears to parallel closely the behavior of analogous chlorosilane reagents. With ethoxysilane reagents ^{13}C NMR is found to be quite useful, especially for determining the fate of ethoxy groups. In all of the cases studied, the products are characterized primarily by single silane-to-surface attachments of each silane silicon atom. The presence of absorbed water is found to play an important role in the course and rate of the silylation reactions, especially those employing ethoxysilane reagents. The NMR data are used to address the question of horizontal and vertical polymerization within the silane phase on the silica surface.

54325 **Molecular and electronic structure of phosphonium cyclopropylide (H_3P = $C(CH_2)_2$): a theoretical study.** Vincent, M.A. (Lawrence Berkeley Lab., CA); Schaefer, F. III; Schier, A.; Schmidbaur, H. *Journal of the American Chemical Society;* **105**: No. 12, 3806-3811(15 Jun 1983). Contract AC03-76SF00098.

Theoretical studies have been carried out for a phosphonium cyclopropylide model, $H_3P{=}C(CH_2)_2$. The molecule was shown to have a ground-state equilibrium geometry (structure I) with a pyramidal carbanion center, the details being in satisfactory agreement with experimental findings for the triphenylphosphine cyclopropylide homologue. One of the phosphorous hydride (PH_3) hydrogen atoms is affected by the carbanion (partial) negative charge, and its position shows substantial distortion away from the idealized tetrahedral phosphorus geometry. In the energy profile for the cabanion inversion the stationary point of maximum energy (two imaginary vibrational frequencies) occurs not for the planar carbanion configuration but well beyond in a situation with a dihedral angle H0PClC2 of 123° instead of 90°. The rotated configuration (a genuine transition state) is virtually the eclipsed analogue of structure I. The barriers to inversion and rotation are predicted to be 6.3 and 5.8 kcal, respectively. Calculated bond distances, bond angles, dihedral angles, total energy values, and total electron populations on atoms are given for all three conformations. Atomic orbital components and energies of frontier orbitals of the ground state are also discussed. 3 figures, 4 tables.

54326 **Activation of C-H bonds in saturated hydrocarbons on photolysis of (eta^5-C_5Me_5)(PMe_3)IrH_2. Relative rates of reaction of the intermediate with different types of C-H bonds and functionalization of the metal-bound alkyl groups.** Janowicz, A.H. (Univ. of California, Berkeley); Bergman, R.G. *Journal of the American Chemical Society;* **105**: No. 12, 3929-3939(15 Jun 1983). Contract AC03-76SF00098.

Irradiation of (eta^5-pentamethylcyclopenta-dienyl)(trimethyl phosphine) dehydroiridium (eta^5-C_5Me_5)(PMe_3)IrH_2 in saturated hydrocarbons using a 500 W Oriel focused-beam mercury lamp leads to extrusion of hydrogen and production of the hydrido alkyl iridium complexes (----HRIr). Competition experiments were used to measure relative rates at which the intermediate formed on hydrogen loss reacts with different types of C-H bonds. Relative to cyclohexane (1), these rates are: benzene (4), cyclopropane (2.65), cyclopentane (1.6), neopentane (1.14), cyclodecane (.23), and cyclooctane (.09). Reductive elimination of hydrocarbon occurs at elevated temperature, regenerating the intermediate, which may then react with another hydrocarbon acting as solvent. The factors which presumed to influence the rates of reaction of transition-metal complexes with saturated C-H bonds are discussed.

54327 **Carbon-13 magnetic resonance of hydroaromatics. 2. Conformation of tetralin and tetrahydroanthracene and their methyl derivatives.** Morin, F.G.; Horton, W.J.; Grant, D.M.; Dalling, D.K.; Pugmire, R.J. (Univ. of Utah, Salt Lake City). *Journal of the American Chemical Society;* **105**: No. 12, 3992-3998(15 Jun 1983). Contract AC02-78ER05006.

Carbon-13 chemical shift data have been acquired for 36 methylated tetralins and tetrahydroanthracenes. A least-squares regression analysis has been undertaken on the ring carbons of compounds of unequivocal conformation to determine methyl substituent parameters for the two distinct aliphatic positions and the results have been used to estimate the position of equilibrium of conformationally mobile compounds. It is concluded that 1-methyltetralin exists in essentially equally populated conformers at room temperature but that the 2-methyl derivative is dominated by the conformation with an equatorial methyl group. Substituent parameters are compared with those previously determined for methylated cyclohexanes. A similar analysis of the methyl chemical shifts was unsuccessful owing, in part, to the highly flexible nature of the saturated ring. 3 figures, 4 tables.

54328 **Chromopeptides from phycoerythrins. Structure and linkage of a phycoerythrobilin tryptic tripeptide derived from a B-phycoerythrin.** Schoenleber, R.W.; Leung, S.L.; Lundell, D.J.; Glazer, A.N.; Rapoport, H. (Lawrence Berkeley Lab., CA). *Journal of the American Chemical Society;* **105**: No. 12, 4072-4076(15 Jun 1983).

Phycoerythrobilin peptides were prepared from Porphyridium cruentum B-phycoerythrin by tryptic digestion and isolated under mild conditions without alteration in the spectroscopic properties of the bilin. High-resolution ^1H NMR spectral analysis of the smallest trypsin fragment derived from the α subunit of B-phycoerythrin, the α_1-B-phycoerythrobilitripeptide (3), has provided direct proof that the bilin is linked to the peptide through a single bond, a thioether linkage at the 3′-position of ring A. Two linkages between the bilin and peptide have been proposed by others. The present study confirms previous reports on the major structural features of

the free phycoerythrobilin chromophore and indicates probable stereochemical assignments for all of the chiral centers. 5 figures, 2 tables.

54329 **Interconversion of methylene and ketene ligands on a triosmium cluster. Crystal and molecular structure of the ketene complex $Os_3(CO)_{12}(eta^2(C,C,\mu\text{-}CH_2CO)$.** Morrison, E.D. (Pennsylvania State Univ., University Park); Steinmetz, G.R.; Geoffroy, G.L.; Fultz, W.C.; Rheingold, A.L. *Journal of the American Chemical Society;* **105**: No. 12, 4104-4105(15 Jun 1983).

The first structural details, of a complex of an unsubstituted ketene ligand, are described. 1 figure.

54330 **Concerning the electronic structure of the ions M(bpy)3i (M = Fe, Ru, Os; bpy = 2,2'-bipyridine).** Kober, E.M.; Meyer, T.J. *Inorganic Chemistry;* **22**: No. 11, 1614-1616(25 May 1983).

In the complexes $M(bpy)_3^{2+}$ (M = iron (Fe), ruthenium (Ru), osmium (Os); bpy = 2,2'-bipyridine), the metal dπ(t/sub 2g/) orbitals are resolved into A_1 and E components. Analyses of the electronic absorption and EPR spectra show that the A_1 orbital lies higher in energy than the E orbitals, so that the complexes have an $^2A_1$ ground state. An $^3A_1$ ground state is consistent with theoretical expectations. Further, the orbital splitting in the dπ levels is argued to increase in the order Fe < Ru < Os. The information obtained in the analysis should prove useful in analyzing the metal to ligand charge-transfer (MLCT) absorption spectra of the analogous species $M(bpy)_3^{2+}$. 2 figures, 1 table.

54331 **Bimetallic anionic formyl complexes: synthesis and properties.** Tam, W.; Marsi, M.; Gladysz, J.A. *Inorganic Chemistry;* **22**: No. 10, 1413-1421(11 May 1983).

Three bimetallic anionic complexes, (2) lithium + dimanganese nonacarbonyl formyl$^-$, (3) lithium + rhenium manganese nonacarbonyl formyl$^-$, and (4) lithium + cisdirhenium nonacarbonyl formyl, are prepared by the reaction of lithium triethylboron hydride with the corresponding neutral metal carbonyl dimers, dimanganese decacarbonyl and manganese rhenium decarbonyl. 2 has a half-life of ca 8 min at room temperature, 4 is stable for days and is easily isolated as a tetrahydrofuran solvate. When 2 - 4 are treated with electrophiles such as benzaldehyde, iron pentacarbonyl, n-octyl iodide, hydride transfer occurs to produce benzyl alcohol, lithium + iron tetracarbonyl formyl$^-$ complex, and octane, respectively. 3 is the weakest hydride donor. Reaction of 4 with methyl iodide produces ca 52% methane. The only identifiable product from the pyrolysis of 4 is dirhenium decacarbonyl; photolysis of 4 produces lithium + dirhenium nonacarbonyl hydride. 1 figure.

54332 **Nuclear magnetic resonance study of ethylenediaminetetrakis(methylenephosphonic acid) and some metal complexes.** Rizkalla, E.N.; Choppin, G.R. *Inorganic Chemistry;* **22**: No. 10, 1478-1482(11 May 1983).

The ^1H NMR spectra of ethylenediaminetetrakis(methylenephosphonic acid) (ENTMP) and of some metal complexes were interpreted to indicate that the nitrogens are preferentially protonated in the free ligand whereas the phosphonate groups are protonated in the metal complexes. A single ABX pattern for lanthanide-ENTMP complexes is consistent with a time-averaged symmetry for the ligand about the metal involving long-lived lanthanum-nitrogen (Ln-N) and short-lived lanthanum-oxygen (Ln-O) bonds. The ^{31}P NMR pattern also supports such averaged equivalence of all phosphonate groups. The calcium (Ca) ENTMP complex has short-lived Ca-N and Ca-O bonds. 4 figures, 4 tables.

54333 **Regiospecific incorporation of bromine and iodine into phenols using (trimethylsilyl)phenol derivatives.** Wilbur, D.S.; Stone, W.E.; Anderson, K.W. (Los Alamos National Lab., NM). *Journal of Organic Chemistry;* **48**: No. 9, 1542-1544(6 May 1983).

In the investigation, three regiospecific (trimethylsilyl)-phenols and the corresponding methyl ethers and acetates were used as model compounds to optimize the reaction conditions necessary to obtain regiospecific replacement of the trimethylsilyl group by bromine and iodine and some radionuclides of these halogens. The results are reported. 1 table.

54334 **Cross polarization and magic angle sample spinning NMR spectra of model organic compounds. 1. Highly protonated molecules.** Alemany, L.B.; Grant, D.M.; Pugmire, R.J.; Alger, T.D.; Zilm, K.W. (Univ. of Utah, Salt Lake City). *Journal of the American Chemical Society;* **105**: No. 8, 2133-2141(20 Apr 1983). Contract AC02-78ER05006.

CP/MAS ^{13}C NMR spectra were obtained at various contact times on ten solid organic compounds containing a variety of simple functional groups. The spectra show that signal intensities that agree with atomic ratios can be obtained with a contact time of 2.25 ms and often with a contact time as short as about 1 ms. Computer analysis of signal intensities obtained at a minimum of ten different contact times provides T/sub CH/ data that are consistent with these experimental results. The experimental results are also consistent with the previously reported lack of significant variation in the spectra of complex organic solids obtained with contact times of about 1 to 3 ms. In general, nonprotonated carbon atoms polarize more slowly than protonated carbon atoms. The compounds exhibit a wide range of proton spin lattice relaxation times. Some compounds exhibit more resonances than are found in the $^{13}C[^1H]$ spectra of the compounds in solution because the crystalline environment removes the nominal spatial equivalence found for carbon atoms related to each other by unimolecular symmetry elements.

54335 **Cross polarization and magic angle sample spinning NMR spectra of model organic compounds. 2. Molecules of low or remote protonation.** Alemany, L.B.; Grant, D.M.; Pugmire, R.J.; Alger, T.D.; Zilm, K.W. (Univ. of Utah, Salt Lake City). *Journal of the American Chemical Society;* **105**: No. 8, 2142-2147(20 Apr 1983). Contract AC02-78ER05006.

Cross polarization/magic angle sample spinning (CP/MAS)^{13}C NMR spectra were obtained at various contact times on five solid organic compounds containing carbon atoms far from intramolecular protons or containing very few hydrogen atoms. Carbon atoms four or more bonds fromthe nearest intramolecular proton cannot be fully polarized before T/sub 1p/(H) effects begin to dominate the proton magnetization. Rapid molecular motion aggrevates the problem because of motional attenuation of the dipolar interaction. Computer-fitted T/sub CH/ and T/sub 1p/(H) parameters are consistent with these experimental results. The simple theories of cross polarization account for incomplete polarization in these cases. In 1,2:4,5-benzenetetracarboxylic dianhydride, $C_{10}H_2O_6$, the relative aromatic and carbonyl signal intensities are only 5% from the ideal values on the basis of atomic ratios, but absolute intensities can be seriously reduced. In general, CP/MAS NMR provides a convenient and useful quantitative method for studying diamagnetic, organic solids of low molecular weight that is competitive to other physical methods even for molecules of low or remote protonation.

54336 **Effects of porosity and surface area of octadecyl-derivatized silica on fractionations of oligomers of 800 MW polystyrene.** Hsu, T.B.; Howard, W.A.; Rogers, L.B. (Univ. of Georgia, Athens). *Separation Science and Technology;* **17**: No. 15, 1623-1633(Dec 1982).

Increasing the pore size of silica used to produce a C_{18}-derivatized column packing decreased the exclusion of the larger oligomers of an 800 MW sample of monodisperse polystyrene. More important was the decrease in surface area which degraded the fractionation of oligomers, which was based upon adsorption. Larger sample volumes and higher concentrations also degraded that fractionation, as expected.

4004 Electrochemistry

REFER ALSO TO CITATION(S) 53784, 54313, 55112

54337 **Electrochemical studies of molten sodium carbonate.** Dunks, G.B.; Stelman, D. (Rockwell International Corp., Canoga Park, CA). *Inorganic Chemistry;* **22**: No. 15, 2168-2177(20 Jul 1983). Contract AT03-76ER70030.

Electrochemical studies of sparged beds of sodium carbonate at 900°C employing mixtures of oxygen, carbon dioxide, and water

vapor were conducted to determine the identities and relative concentrations of melt species. Analysis of experimental current-potential curves was done by fitting the curves with composite curves that consisted of the algebraic sum of eight computer-generated theoretical waves. The most prominent features of the curves were the 1-electron reversible couple O_2^-/O_2^{2-} superimposed on a 2-electron reversible couple proposed to be CO_4^{2-}/CO_3^{2-}, O^{2-} and, at higher overpotential, a 2-electron irreversible wave proposed to be the reduction of $C_2O_3^{2-}$ ion. ESR spectra confirmed the presence of superoxide ion in frozen-melt matrix. Under sparged conditions, the thermal decomposition of sodium carbonate appears to produce peroxide ion in addition to oxide ion. A sequence of reactions is proposed to account for the interconversion of melt species.

54338 **Computerized system for matching and stretching two-dimensional gel patterns represented by parameter lists.** Taylor, J.; Anderson, N.L.; Anderson, N.G. (Argonne National Lab., IL). pp 383-400 of Electrophoresis '81. Allen; Arnaud (eds.). Berlin, Germany; Walter de Gruyter and Company (1981). Contract W-31-109-ENG-38.

Described is a method by which one pattern is stretched by a computer into registration with another pattern and how individual protein spots are matched between the two. One of these patterns is called the master pattern and may be a composite of many other patterns; it serves as a reference against which successive new patterns are matched. Each spot of the master pattern is assigned a unique master spot number (MSN). A match is established by associating the MSN of a master set spot to its homologous object spot. By matching spots from a series of patterns to a unique, prenumbered master, the assigned MSN's cross-index each spot through all the gels. The computer algorithm described is implemented in two basic parts. The goal of the coordinate stretching procedure is to transform the object spot coordinates so that registration is improved in a local region of the pattern. The matching procedure matches object spots with master spots in a local neighborhood. As examples, two representative patterns were obtained from autoradiographs of 2 different gels run from the same sample of human lymphocites labelled with sulfur 35 methionine. 4 figures.

4005 Photochemistry

REFER ALSO TO CITATION(S) 53740, 53784, 54313, 54315, 54330, 54331

54339 **Anion radicals of bacteriochlorophylls c, d, and e. Likely electron acceptors in the primary photochemistry of green and brown photosynthetic bacteria.** Fajer, J. (Brookhaven National Lab., Upton, NY); Fujita, I.; Forman, A.; Hanson, L.K.; Craig, G.W.; Goff, D.A.; Kehres, L.A.; Smith, K.M. *Journal of the American Chemical Society;* **105**: No. 12, 3837-3843(15 Jun 1983). Contract AC02-76CH00016.

Representative redox, optical, electron spin resonance (ESR) and (ENDOR) data and molecular orbital calculations are reported for the anion radicals of the homologous bacteriochlorophylls and bacteriopheophorbides c, d, and e. The chromophores (Chlorobium chlorophylls) have previously been identified or are suspected to exist in the reaction centers of green (c and d) and brown (e) photosynthetic bacteria which appear to straddle green plants and purple bacteria on an evolutionary scale. An early role in the light-driven electron-transport chain of these bacteria is proposed for the Chlorobium chlorophylls. Diagnostic optical and electron paramagnetic spectral signatures are presented for the anion radicals which distinguish them from subsequent acceptors and would identify them in vivo. 8 figures, 3 tables.

54340 **Photochemistry of mixed-metal bimetallic complexes containing pentacyanoferrate(II) or pentaammineruthenium(II) metal centers. Evidence for some intramolecular energy-transfer reactions.** Moore, K.J.; Lee, L.; Figard, J.E.; Gelroth, J.A.; Stinson, A.J.; Wohlers, H.D.; Petersen, J.D. (Clemson Univ., SC). *Journal of the American Chemical Society;* **105**: No. 8, 2274-2279(20 Apr 1983). Contract AS09-80ER10671.

The series of complexes $B_5MLM'B_5$, where B_5M = $(NH_3)_5Ru$/sup II/or $(CN)_5Fe$/sup II/, L = 4 cyanopyridine (4-CNpy), pyrazine (pz), or 4,4′-bipyridine (4,4′-bpy), and M′B′$_5$ = Rh/sup III/$(NH_3)_5$ or Co/sup III/$(CN)_5$, display highly absorbing metal-to-ligand charge-transfer (MLCT) bands in the visible spectral region that can be assigned as predominantly M(d/sub π/) → L(p/sub π/*) in character. MLCT irradiation of these complexes generally leads to cleavage of either the M-L or L-M′ bonds. Cleavage of the L-M′ bond, a reaction characteristic of an excited state localized on M′ (not the metal center initially involved in photon absorption), is a result of intramolecular, energy-transfer processes. This phenomenon is observed only for the 4-CNpy- and 4,4′-bpy-bridged Ru(II)/Rh(III) bimetallic complexes. The pz-bridged Ru(II)/Rh(III) bimetallic complex shows little photoreactivity at either metal center. All of the Fe(II) bimetallic complexes show Fe(II)-L bond breaking as the sole photochemical process with no evidence of any intramolecular energy transfer. The quantum yields for reactions driven by intramolecular energy transfer are small ($10^{-4} < PHI \leq 10^{-2}$), but photochemical reactions normally requiring ultraviolet incident irradiation can be driven by visible light by using these highly absorbing, antenna fragments as internal sensitizers.

54341 **Photolysis of water vapor on titanium/TiO_2 surfaces.** Stevens, C.G.; Wessman, N.J.; Bowman, J.E.; Ramsey, W.J. (Lawrence Livermore National Lab., CA). *Chemical Physics Letters;* **91**: No. 5, 335-338(24 Sep 1982). Contract W-7405-ENG-48.

The photolysis of water vapor on the surface of titanium coated polycrystalline n-TiO_2 at a temperature of 380°C is reported. A quantum conversion efficiency for hydrogen production of 2% is measured for excitation above the band gap of TiO_2. The experiments demonstrate the catalytic nature of the reaction with respect to the active material and also suggest an important role played by the titanium metal in the observations.

54342 **Chemiluminescence of benzo[a]pyrene-7,8-diol.** Seliger, H.H.; Thompson, A.; Hamman, J.P.; Posner, G.H. (Johns Hopkins Univ., Baltimore, MD). *Photochemistry and Photobiology;* 1-7(1982). Contract AC02-76EV03277.

The chemiluminescence (CL) of benzo[a]pyrene-7,8-diol (BP-7,8-diol) originally observed in liver microsomal extracts has been produced in greater than 10^4 higher yield by reaction with sodium hypochlorite and hydrogen peroxide (NaOCl - H_2O_2). The kinetics and the substrate concentration dependence for the NaOCl/H_2O_2 initiated CL are the same as those for Rose Bengal photosensitization of CL. In this latter singlet oxygen generating system the CL is quenched by β-carotene at a diffusion controlled rate of 1.2×10^{10} M^{-1} s^{-1}. The chemically-initiated CL emission spectrum of BP-7,8-diol appears to be the same as that of the microsomal CL. The long lifetime of the CL (tau = 240s), the production of CL by $^1O_2$ and the effects of electron donors upon the effective rate constant for decay of CL are consistent with the formation of a dioxetane intermediate. The linear dependence of CL upon substrate concentration indicates that the emission is from a monomer excited state rather than from an exciplex as suggested previously. Under the same chemical conditions the relative light yields from benzo[a]pyrene, its 12 monohydroxy derivatives and its other dihydro-diol derivatives range from 10^{-2} to 10^{-5} of the CL from BP-7,8-diol. The specificity of the chemically-initiated CL of BP-7,8-diol may provide a sensitive assay for this metabolite. 6 figures.

54343 **Rate constants for the decay and reactions of the lowest electronically excited singlet state of molecular oxygen in solution.** Wilkinson, F. (Univ. of Technology, Loughborough, England); Brummer, J.G. *Journal of Physical and Chemical Reference Data;* **10**: No. 4, 809-999(1981). Contract AC02-76ER00038.

The available rate data on the reactivity and physical deactivation of molecular oxygen in its first electronic excited state ($^1\Delta$/sub g/) in liquid solution have been critically compiled. Where possible, relative rates reported in the literature have been normalized to standard values selected by a statistical analysis of the experimental data. Second order rate constants for the deactivation and chemical reaction of singlet oxygen are reported for 670 compounds. Additionally, psuedo first order rate constants (k/sub d/)

for solvent deactivation of single oxygen are reported for 50 different solvents.

4006 Radiation Chemistry

REFER ALSO TO CITATION(S) 54386

4007 Radiochemistry And Nuclear Chemistry

REFER ALSO TO CITATION(S) 55063

54344 (ARL/TR—050, pp 70-72) **Effect of milking efficiency on Tc-99 content of Tc-99m derived from Tc-99m generators.** Bonnyman, J. Jan 1983. NTIS (US Sales Only), PC A08/MF A01.

In Annual review of research projects 1981.

Tc-99m obtained by separation from its parent Mo-99 always contains Tc-99 produced by decay of Tc-99m and Mo-99. Factors effecting the Tc-99/Tc-99m ratios are discussed. An HPLC method has been developed to measure the $^{99}TcO_4^-$ content of sodium pertechnetate from generators with a detection limit of 0.9 ng Tc-99 for a 500 µl/ aliquot of TcO_4^- -99m. First eluates of 10 chromatographic generators gave Tc-99/Tc-99m ratios ranging from 3.5-46 ng Tc/mCi Tc-99m measured at the time of milking. The measurements indicate that Tc-99/Tc-99m ratios high enough to cause adverse labelling effects could be found in 'instant pertechnetate' and in the first eluate from Tc-99m generators for the activities normally used in radiopharmaceutical production.

54345 (RISO-M—2273) **Weathering and decontamination of radioactivity deposited on asphalt surfaces.** Warming, L. (Risoe National Lab., Roskilde (Denmark)). Dec 1982. 22p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703564.

Longlived fission products might be deposited in the environment after a serious reactor accident. At Risoe we have studied how danish weather conditions and fire hosing influence the decontamination of Rubidium 86 (representing Cesium 134 and 137) Barium-Lanthanum 140 and Ruthenium 103 deposited on asphalt surfaces. Measurements have been done at different types of roads and during all seasons including winter with snow and ice cover of the roads. The results from the first five experiments were used for calculating doses to the population in the land contamination (RISO-R-462).

54346 (UJV—6256-CH) **Physical properties of uranium hexafluoride. Part A. Phase equilibria.** Urbanec, Z. (Ustav Jaderneho Vyzkumu CSKAE, Rez (Czechoslovakia)). Aug 1982. 20p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702971.

Temperature, pressure and density values at the triple point, the sublimation point and the critical point of uranium hexafluoride and its equilibrium vapour pressure were critically evaluated using the literature data. Recommended values are presented.

54347 **In vitro transfer of Ga-67 from transferrin to ferritin.** Weiner, R.E. (Univ. of Kansas, Kansas City); Schreiber, G.J.; Hoffer, P.B. *Journal of Nuclear Medicine;* **24**: No. 7, 608-614(Jul 1983). Contract AC02-78EV04625.

Equilibrium dialysis was used to examine the binding of Ga-67 to horse spleen ferritin (HFE), and the ability of this protein to remove Ga-67 originally bound to human transferrin (TF). Seventy hours were required for the HFE to bind 70% of the activity. When HFE was placed in competition with preformed TF-Ga-67 complex, little nuclide was translocated to HFE. Upon the addition of compounds of low molecular weight that occur intracellularly, this transfer was dramatically enhanced. In the presence of 1 mM adenosine triphosphate (ATP), the most effective mediator examined, the final distribution was 17% bound to TF and 62% to HFE, with 16% not protein-bound. In the absence of any mediator, the same distribution was 84, 6, and 3%. Control experiments with ATP showed that little radionuclide was transferred from TF to albumin. These results add support to the previous suggestions of the potential role of ferritin in Ga-67 localization.

54348 **L-[1-^{11}C]leucine: routine synthesis by enzymatic resolution.** Barrio, J.R.; Keen, R.E.; Ropchan, J.R.; MacDonald, N.S.; Baumgartner, F.J.; Padgett, H.C.; Phelps, M.E. (Univ. of California, Los Angeles). *Journal of Nuclear Medicine;* **24**: No. 6, 515-521(Jun 1983). Contract AC03-76SF00012.

L-[1-^{11}C]leucine, suitable for the determination of cerebal protein synthesis rates in man using positron emission tomography, has been synthesized using a modified Bucherer-Strecker reaction sequence. The isolation of the pure L-amino acid isomer from the enantiomeric mixture, initially obtained using either an open or closed reaction vessel, was achieved using a D-amino acid oxidase/catalase enzyme complex immobilized on a Sepharose support. The O_2 required by the D-amino acid oxidase as the hydrogen acceptor was supplied by catalase. The L-[1-^{11}C]leucine was obtained with a radiochemical purity of >99% and with a radiochemical yield of 25%. Using a remote, semiautomated synthesis system, typical production time was 30 to 40 min after preparation of $H^{11}CN$. The use of immobilized enzymes for rapid and effective resolution of amino acid enantiomers eliminates the possibility of protein contamination and assures the production of a sterile, pyrogen-free product.

54349 **Rapid method for the determination of americium-curium, plutonium and thorium in biological and environmental samples.** Bernabee, R.P. (Dept. of Energy, Idaho Falls, ID). *Health Physics;* **44**: No. 6, 688-691(Jun 1983).

The determination of plutonium, americium, curium, and thorium in environmental, biological and nuclear process waste samples is discussed. A method for sample decomposition and initial separation of the lanthanides and actinides which uses perchloric-hydrofluoric acids and cerium fluoride for the initial separation is presented. This procedure provides a rapid and reliable determination of plutonium, thorium, americium, and curium on water samples, on soil and sediment samples of up to 1 gram and up to 5 gram of organic material. (KRM)

54350 **Raman spectrometric studies of actinide(V) and -(VI) complexes in aqueous sodium carbonate solution and of solid sodium actinide(V) carbonate compounds.** Madic, C.; Hobart, D.E.; Begun, G.M. *Inorganic Chemistry;* **22**: No. 10, 1494-1503(11 May 1983). Contract W-7405-ENG-26;AS05-76ER04447.

Raman spectra of all the actinide(V) (except protactinium (Pa)) and actinide(VI) complexes in 2 M(sodium carbonate Na_2CO_3) solutions have been obtained. A resonance Raman effect was observed for neptunium(Np)(VI), plutonium(Pu)(VI), and americium(Am)(VI) and found to be related to the position of the charge-transfer bands observed in the corresponding electronic spectra and to the formal potential of actinide(VI)/actinide(V) couples in carbonate solution. No resonance effect was observed in the Raman spectrum of uranium (U(VI)). The symmetric stretching frequency (nu_1) of the MO_2^{2+} group was shifted in carbonate solutions as compared to acidic noncomplexing solutions and decreased regularly with an increase in the atomic number of the actinide considered. In contrast, the nu_1 frequencies of the MO_2^+ group for actinide(V) species in carbonate solutions did not vary as the atomic number of the actinide increased. In comparison to the ν_1 frequencies in acidic solutions, in carbonate solution a small negative shift was observed for nu_1 of Np(V) and a positive shift was obtained for nu_1 of Am(V). The Raman spectra of $Na_3MO_2(CO_3)_2$ solid compounds were obtained for M = Np, Pu, and Am. The nu_1 frequencies of the MO_2^+ ions decreased linearly with increasing atomic number of the actinide and were higher than the corresponding values for aqueous MO_2^+ ions. The differences in behavior observed between actinide(V) and -(VI) species in noncompexing media and in carbonate media may be related to possible hydrogen bonding between the oxygen of the actinide(V) oxycation and water molecules. 12 figures, 3 tables.

4008 Combustion, Pyrolysis, And High-temperature Chemistry

REFER ALSO TO CITATION(S) 53352, 53420, 54331, 54337, 55111

54351 **(AD-A—129907/2) Lectures on mathematical combustion. Lecture 1. Pre-asymptotic combustion revisited. Interim technical report.** Buckmaster, J.D.; Ludford, G.S.S. (Cornell Univ., Ithaca, NY (USA). Dept. of Theoretical and Applied Mechanics). Jan 1983. 26p. (TR—146). NTIS, PC A03/MF A01.

The description of reacting systems can be simplified when the so-called activation energy is large; the notion is an old one, but its full power is only released by modern singular perturbation theory. More than forty years ago, Frank-Kamenetskii introduced approximations based on large activation energy to construct a thermal theory of spontaneous combustion, and we shall start there. His problem, which neglects the fluid-mechanical effects of main concern to us, focuses attention on the reaction and thereby acts as a precursor for the lectures that follow. The problem and its generalizations have been the happy hunting grounds of mathematical analysts for many years, but it was not until quite recently that a complete description of the ignition and explosion processes was made available of Kapila and Kassoy (working separately) through activation-energy asymptotics, the main theme of these lectures.

54352 **(AD-A—129908/0) Lectures on mathematical combustion. Lecture 2. Governing equations, asymptotics, and deflagrations. Interim technical report.** Buckmaster, J.D.; Ludford, G.S.S. (Cornell Univ., Ithaca, NY (USA). Dept. of Theoretical and Applied Mechanics). Jan 1983. 24p. (TR—147). NTIS, PC A02/MF A01.

The problem of formulating the governing equations of combusion consists, as its simplest, in characterizing the flow of a viscous, heat-conducting mixture of diffusing, reacting gases. This is a formidable task that could fill a week of lectures by itself, most of which would not be of great interest to a mathematical audience. Mindful of this, we shall limit ourselves to a description, rather than a derivation, of the simplest equations that can be brought to bear on combustion problems. Only the most important assumptions normally used to justify the equations will be discussed; for a more extensive treatment the reader is referred to Buckmaster and Ludford (1982).

54353 **(AD-A—129909/8) Lectures on mathematical combustion. Lecture 3. General deflagrations. Interim technical report.** Buckmaster, J.D.; Ludford, G.S.S. (Cornell Univ., Ithaca, NY (USA). Dept. of Theoretical and Applied Mechanics). Jan 1983. 22p. (TR—148). NTIS, PC A02/MF A01.

In the last lecture we examined the plane, steady, adiabatic, premixed flame and deduced an explicit formula for its speed. By using judicious choice of parameters this formula can be made to agree roughly with experiment; precision is not a reasonal goal, given the crude nature of our model. Noteworthy is the extreme sensitivity of the speed to variations in the flame temperature: an 0(1) change generates an exponentially large change in flame speed. Such variations in speed (caused, for example, by changes in mixture strength) are not excessive numerically (at least for fuels burnt in air), because activation energies and fractional changes in temperature are modest; but in an asymptotic analysis they present a potential obstacle to discussion of multidimensional and/or unsteady flames. Then signigicant variations, spatial and/or temporal, in the flame temperature can be expected and, if the sensitivity mentioned above is any guide, there will be correspondingly large spatial and/or temporal variations in the flame speed. A mathematical framework in which to accomodate these is not obvious. (The first lecture dealt with special circumstances for which such variations were manageable).

54354 **(AD-A—129910/6) Lectures on mathematical combustion. Lecture 4. SVFS and NEFS. Interim technical report.** Buckmaster, J.D.; Ludford, G.S.S. (Cornell Univ., Ithaca, NY (USA). Dept. of Theoretical and Applied Mechanics). Jan 1983. 25p. (TR—149). NTIS, PC A02/MF A01.

For want of a complete analysis of multidimensional flows in preasymptotic days, it was natural to try to identify special characteristics that play particularly important roles in the understanding of flame behavior. Flame speed and temperature are examples of such characteristics that have already been identified; a more subtle characteristic, introduced by Karlovitz, is flame stretch. The authors start by discussing this concept, so as to have it available when we come to discussing general slowly varying and near-equidiffusional flames.

54355 **(AD-A—129911/4) Lectures on mathematical combustion. Lecture 5. Stability of the plane deflagration wave. Interim technical report.** Buckmaster, J.D.; Ludford, G.S.S. (Cornell Univ., Ithaca, NY (USA). Dept. of Theoretical and Applied Mechanics). Jan 1983. 25p. (TR—150). NTIS, PC A02/MF A01.

Steady, plane deflagration was introduced in the second lecture; here we shall consider infinitesimal perturbations of it and so examine its stability. We shall find two basic phenomena - the hydrodynamic and Lewis-number effects.

54356 **(AD-A—129912/2) Lectures on mathematical combustion. Lecture 6. Cellular flames. Interim technical report.** Buckmaster, J.D.; Ludford, G.S.S. (Cornell Univ., Ithaca, NY (USA). Dept. of Theoretical and Applied Mechanics). Jan 1983. 31p. (TR—151). NTIS, PC A03/MF A01.

We shall now examine the left stability boundary that was uncovered in lecture 5 in our discussion of NEFs (figure 5.3). The boundary is associated with instabilities leading to cellular flames, i.e. flames whose surfaces are broken up into distinct luminous regions (cells) separated by dark lines. Each line is a ridge of high curvature, convex towards the burnt gas. For a nominally flat flame these cells are very unsteady, growing and subdividing in a chaotic fashion; but curvature, for example, can make stationary.

54357 **(AD-A—129913/0) Lectures on mathematical combustion. Lecture 7. Pulsating flames. Interim technical report.** Buckmaster, J.D.; Ludford, G.S.S. (Cornell Univ., Ithaca, NY (USA). Dept. of Theoretical and Applied Mechanics). Jan 1983. 28p. (TR—152). NTIS, PC A03/MF A01.

In section 5. it was found that plane NEFs to sufficiently large Lewis number are unstable. Since Im(a) 0 on the stability boundary, the instability is likely to result in either a pulsating flame or a flame that supports traveling waves. Such flames are the subject of this lecture.

54358 **(AD-A—129914/8) Lectures on mathematical combustion. Lecture 8. Counterflow diffusion flames. Interim technical report.** Buckmaster, J.D.; Ludford, G.S.S. (Cornell Univ., Ithaca, NY (USA). Dept. of Theoretical and Applied Mechanics). Jan 1983. 25p. (TR—153). NTIS, PC A02/MF A01.

The fundamental characteristic of diffusion flames is that the two reactants, fuel and oxidizer, are supplied in different parts of the combustion field, so that they must come together and mix by diffusion before reaction can take place. Counterflowing streams provide one method of bringing them together; the resulting diffusion flames, whose main properties were established by Linan, is the subject of this lecture.

54359 **(AD-A—129915/5) Lectures on mathematical combustion. Lecture 9. Spherical diffusion flames. Interim technical report.** Buckmaster, J.D.; Ludford, G.S.S. (Cornell Univ., Ithaca, NY (USA). Dept. of Theoretical and Applied Mechanics). Jan 1983. 27p. (TR—154). NTIS, PC A03/MF A01.

Law has shown that the analysis of spherical diffusion flames is quite similar to that of counterflow diffusion flames, so that some explanation is needed for devoting a separate lecture to them. There are two good reasons. First, the constant-density approximation has been used throughout these lectures in discussing all but plane flames, so there is room for a problem which does not neglect variations in density. (Plane diffusion flames have to be chambered, i.e. the reactants must be supplied at finite locations, which leads to distracting complications). Secondly, the spherical diffusion

flame can lead to quite different (and unusual) responses. These arise in the technologically important application to the quasi-steady phase of fuel-drop burning, when a more realistic boundary condition than the conventional one is used.

54360 **(AD-A—129916/3) Lectures on mathematical combustion. Lecture 10. Free-boundary problems. Interim technical report.** Buckmaster, J.D.; Ludford, G.S.S. (Cornell Univ., Ithaca, NY (USA). Dept. of Theoretical and Applied Mechanics). Jan 1983. 35p. (TR—155). NTIS, PC A03/MF A01.

Throughout these lectures we have ensured that the reaction terms vanish everywhere except in a thin (flame) sheet, whose location has to be found as part of the solution. So far this free boundary has been either a plane, a circular cylinder, a sphere, or a perturbation of one of these; we now consider problems with more complicated free boundaries.

54361 (CONF-810602—, pp 186-197) **Improved prediction of flame spreading during convective burning in solid propellant cracks.** Kovacic, S.M.; Kumar, M.; Kuo, K.K. (Pennsylvania State Univ., University Park). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

The development of convective burning in solid propellant cracks was studied both theoretically and experimentally. Comparison of the experimental results of flame spreading with the theoretial prediction of the previous crack combustion model (Kumar and Kuo 1980) showed good comparison except near the crack tip. The model was modified to include: (a) the effect of pressure-wave reflection near the crack tip on local ignition; (b) the effect of flow recirculation in the crack-tip region on local heat transfer to the solid propellant; and (c) turbulent transport terms in the Favreaver-aged conservation equations along the crack. Predicted flame-spreading rates obtained from the modified model showed good agreement with experimental data, indicating significant improvements (near the crack tip) over predictions of the previous model. The inclusion of turbulent transport terms along the length of the crack did not significantly affect the flame-spreading process. Results of this study indicate that the effects of compression-wave reflection and recirculation are important in the crack tip region.

54362 (CONF-8006216—, pp 79-91) **Liquid phase decomposition: a possible problem with fuels in high pressure systems.** Gerstein, M.; Choudhury, P.R. (Univ. of Southern California, Los Angeles). 1980. NTIS, PC A12/MF A01.

From Heat Transfer and Fluid Mechanics Institute conference; Los Angeles, CA, USA (23 Jun 1980).

Liquid phase decomposition during the process of evaporation, which has been ignored in the past, can become a major source of problem in a burner, particularly at higher pressure or using synthetic fuels. A possible mechanism of liquid phase decomposition leading to residue formation has been proposed. Behavior of a droplet, residue formation, and finally residue burning in a simple two-phase system have been investigated.

54363 (CONF-8006216—, pp 92-107) **Transient ignition in a flat plate boundary layer.** Trevino, C.; Sen, M. (National Univ. of Mexico, Mexico City). 1980. NTIS, PC A12/MF A01.

From Heat Transfer and Fluid Mechanics Institute conference; Los Angeles, CA, USA (23 Jun 1980).

Previous work on boundary layer ignition has been confined mainly to the steady-state problem. In this paper the time dependent situation is analyzed and the validity of the parabolized governing equations is shown to be in the $\delta \rightarrow 0$ limit, where δ is proportional to the local flame velocity relative to the local fluid velocity. Through finite difference methods, temperature and concentration profiles are obtained for the case of a stepwise temperature increase at the wall.

54364 **Fluidization in two-dimensional beds with a jet. 2. Hydrodynamic modeling.** Gidaspow, D.; Ettehadieh, B. (Department of Chemical Engineering, Illinois Institute of Technology, Chicago, Illinois 60616). *Industrial and Engineering Chemistry Fundamentals;* 22: No. 2, 193-202(May 1983). Contract FG21-78ET12229.

The object of this investigation is to develop an experimentally verified hydrodynamic model to predict solids circulation around a jet in a fluidized bed gasifier. Hydrodynamic models of fluidization use the principles of conservation of mass, momentum, and energy. To account for unequal velocities of solid and fluid phases, separate phase momentum balances are developed. Other fluid bed models used in the scale-up of gasifiers do not employ the principles of conservation of momentum. Therefore, these models cannot predict fluid and particle motion. In such models solids mixing is described by means of empirical transfer coefficients. A two-dimensional unsteady-state computer code was developed to give gas and solid velocities, void fractions, and pressure in a fluid bed with a jet. The growth, propagation, and collapse of bubbles was calculated. Time averaged voi fractions were calculated that showed good agreement with void fractions measured with a γ-ray densitometer. Calculated gas and solid velocities in the jet appeared to be reasonable.

54365 **Theoretical studies of the potential surface for the reaction $C(^3P) + H_2 \rightarrow CH_2(^3B_1)$.** Harding, L.B. (Argonne National Lab., IL). *Journal of Physical Chemistry;* 87: No. 3, 441-446(3 Feb 1983). Contract W-31-109-ENG-38.

Large basis set, RHF + 1 + 2, configuration interaction calculations on the reaction of $C(^3P)$ with H_2 are reported. It is found that the reaction proceeds through a weakly avoided crossing of the $^3A_2$ and $^3B_1$ potential energy surfaces, in which the lowest energy path lies only slightly below the C/sub 2nu/ constrained crossing. The magnitude of the barrier is found to be very sensitive to the basis set with the best calculations (4s, 3p, 2d, 1f/3s, 2p, 1d), giving a barrier of ~ 1 kcal/mol.

54366 **Shock-tube study of propane pyrolysis. Rate of initial dissociation from 1400 to 2300 K.** Al-Alami, M.Z.; Klefer, J.H. (Univ. of Illinois, Chicago). *Journal of Physical Chemistry;* 87: No. 3, 499-506(3 Feb 1983).

The pyrolysis of propane in mixtures of 2% and 4% C_3H_8 in Kr has been studied in incident shock waves with the laser-schlieren technique. Forty-seven separate experiments covering 1400 to 2300 K were analyzed for the rate of the initial dissociation, $C_3H_8 \rightarrow CH_3 + C_2H_5$, using a simulation-assisted extrapolation to the time origin for reaction. The simulation employs a mechanism of 30 reactions, the rates for all but the initial dissociation selected from the literature, and is able to fit all features of the density gradient profiles. The derived unimolecular rates show definite indications of falloff, the best fit at low temperatures (< 1800 K) being first order with $k = 7.74 \times 10^{11} \exp(-28030/T)$ +- 20% (s^{-1}), for $1400 < T < 1800$ K, $1.5 <$ rho < 6 μmol/cm³. For higher T the best fit in second order, $k = 2.68 \times 10^{17} \exp(-28300/T)$ +- 20% (cm³/(mol s)), $1800 < T$ 2300 K, $0.8 <$ rho < 1.8 μmol/cm³. The data were also fitted with an RRKM calculation using a modified Gorin model transition state. This fit suggests parameters which seem reasonable on comparison with previous similar calculations, and extrapolates to an infinite-pressure rate constant k/sub ∞/ = $1.48 \times 10^{17} \exp(-43500/T)$ $)s^{-1}$) which is within a factor of 2 of the prior estimate of Tsang, effectively supporting this estimate.

54367 **Catalytic fluidized-bed combustion. Enhancement of sulfation of calcium oxide by iron oxide.** Desai, N.J.; Yang, R.T. (Department of Chemical Engineering, State University of New York at Buffalo, Amherst, New York 14260). *Industrial and Engineering Chemistry Process Design and Development;* No. 1, 119-123(Jan 1983). Contract AC22-80MC14617.

A small amount of iron oxide coated on the surface of dolomite particles substantially increases both the reaction rate and the ultimate capacity for sulfur dioxide sorption. Although the iron oxide coating catalyzes the sulfation of Tymochtee dolomite, it has an inhibiting effect on Greer limestone. The interplay of two opposing effects, increase in the chemical rate and a decrease in pore

diffusion rate due to pore plugging, has been demonstrated by experiments with pellets made from pulverized Greer limestone. All kinetic data were fitted with a pore closing model with a varying porosity in the product layer. For Tymochtee dolomite with 1.08% (by weight based on CaO) Fe_2O_3 coated on uncalcined stone, it has been shown, through a model, that for 90% sulfur retention a 40% reduction of the sorbent requirement can be achieved over the uncatalyzed case. Fluidization tests at 900°C showed that no additional attrition of the sorbent particles was caused by the coated iron oxide.

42 ENGINEERING

4201 General Engineering

54368 (IS-M—439) Clamping force of heat-shrinkable fittings. Rehbein, D.K.; Skillings, B.J.; Smith, J.F.; Thompson, D.O. (Ames Lab., IA (USA)). 1983. Contract W-7405-ENG-82. 13p. (CONF-830811—4). NTIS, PC A02/MF A01. Order Number DE83017691.

From Conference on quantitative NDE; Santa Cruz, CA, USA (7 Aug 1983).

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

A typical coupler using the shape memory phenomenon is fabricated of material with a martensitic transformation near -47°C; the fabricated form is a short, thick-walled tube with a series of four lands along the inner surface. After fabrication the coupler is expanded at liquid air temperatures and is retained at such temperatures until time for use. During use the coupler is simply placed over a pair of tubing or piping ends that are to be joined and the shrinkage which takes place during return to ambient temperatures through the martensitic transformation accomplishes the union. The research reported is aimed at the development of a nondestructive technique for evaluating the clamping force which is produced at a union. Evidence of a finely dispersed second phase may be noted - most likely Ti_4Ni_2O. (LEW)

54369 Method for depositing a uniform layer of particulate material on the surface of an article having interconnected porosity. Wrenn, G.E. Jr.; Lewis, J. Jr. US Patent Application 6-426,364. 29 Sep 1982. 11p. Contract W-7405-ENG-26.

The invention is a method for depositing liquid-suspended particles on an immersed porous article characterized by interconnected porosity. In one form of the invention, coating is conducted in a vessel containing an organic liquid supporting a colloidal dispersion of graphite sized to lodge in surface pores of the article. The liquid comprises a first volatile component (e.g., acetone) and a second less-volatile component (e.g., toluene) containing a dissolved organic graphite-bonding agent. The liquid also contains an organic agent (e.g., cellulose gum) for maintaining the particles in suspension. A porous carbon article to be coated is immersed in the liquid so that it is permeated therewith. While the liquid is stirred to maintain a uniform blend, the vessel headspace is evacuated to effect flashing-off of the first component from the interior of the article. This causes particle-laden liquid exterior of the article to flow inwardly through its surface pores, lodging particles in these pores and forming a continuous graphite coating. The coated article is retrieved and heated to resin-bond the graphite. The method can be used to form a smooth, adherent, continuous coating of various materials on various porous articles. The method is rapid and reproducible.

4202 Facilities And Equipment

REFER ALSO TO CITATION(S) 53410, 53430, 53485, 53494, 53496, 53505, 53506, 53540, 53544, 53548, 53561, 53562, 53562, 53563, 53584, 53588, 53637, 53705, 53711, 53712, 54522, 54633, 55261, 55282, 55310

54370 (AD-A—127135/2) Applications of Josephson junction SQUIDS (superconducting quantum interference device) and arrays. Annual progress report No. 1, 1 September 81-30 September 82. Silver, A.H. (TRW Space and Technology Group, Redondo Beach, CA (USA). Applied Technology Div.). Nov 1982. 42p. NTIS, PC A03/MF A01.

This is the first Annual Report for an effort to demonstrate the application of SQUIDs (Superconducting Quantum Interference Device) and SQUID arrays to microwave systems. The application considered here is a microwave voltage-controlled oscillator. We report on the circuit design, numerical simulation, experimental design, and fabrication of the device including tests of the monolithic impedance transformer. Predicted available power is approximately 10 nW into a load impedance of ohm.

54371 (AD-A—127269/9) Demonstration of SQUID (superconducting quantum interference device) parametric amplifier. Annual report No. 1, 14 September 81-14 September 82. Silver, A.H. (TRW Space and Technology Group, Redondo Beach, CA (USA). Applied Technology Div.). Nov 1982. 34p. NTIS, PC A03/MF A01.

This is the first Annual Report of an effort to demonstrate a low noise superconducting microwave amplifier. The amplifier is a nearly degenerate, single idler parametric amplifier which uses the nonlinear inductance of a single junction SQUID (Superconducting Quantum Interference Device). The design frequency is 9 GHz, 10 dB gain, and 16% bandwidth. In order to maximize the saturation power, the device impedance was chosen near 1ohm and a matching network was designed to transform to 50ohm. In later designs, a coherent array of SQUIDs is expected to increase the power and impedance. This report includes the design and test of the 50ohm to 1ohm broadband transformer, design and fabrication of the SQUID amplifier, and both saturation and noise analyses of the single SQUID and SQUID array. The analytical results, reported to the 1982 Applied Superconductivity Conference are: the noise temperature of the single SQUID parametric amplifier is equal to the amplifier termination temperature T(o), the response is linear to several percent of the flux quantum energy in the SQUID: the amplifier will be saturated by broad band noise if the noise source temperature is much greater than 10 To; and the array parametric amplifier has the same noise temperature as the single device indicating an N-fold increase in dynamic range.

54372 (AD-A—129624/3) Analysis of novel superconducting magnetometer with superior noise and coupling properties. Interim report. Tesche, C.D. (LuTech, Inc., Berkeley, CA (USA)). Nov 1981. 79p. NTIS, PC A05/MF A01.

There is considerable interest in the development of extremely sensitive superconducting magnetometers for the detection of changes in magnetic field intensity. The most sensitive detectors developed up to this time are thin film dc SQUID magnetometers. The dc SQUID consists of a superconducting loop interrupted by two Josephson junctions. If the junctions are biased near the critical current by an externally applied dc bias current, the voltage across the junctions becomes a sensitive function of the flux threading the loop. Thus, the dc SQUID acts like a flux to voltage transducer. The resolution of the dc SQUID magnetometer is determined predominately by three factors. First, the Josephson junctions employed in the device must be non-hysteretic. As a result, the thin film tunnel junctions typically used in the device are externally shunted by a normal resistance. The Johnson noise associated with this resistance produces fluctuations in the voltage across the SQUID.

54373 **(AD-A—129880/1) Research on upgrading structures for host and risk area shelters, phase II. Final report.** Tansley, R.S.; Bernard, R.D.; Cuzner, G.J.; Wilton, C. (Scientific Service, Inc., Redwood City, CA (USA)). May 1983. 276p. (SSI—8144-12). NTIS, PC A13/MF A01.

This report presents a summary of the work conducted during the second year of a five-year program. This research effort provides the engineering basis and guidance for the development of upgrading for host and risk area shelters. This investigation is in support of current Civil Defense planning based on a policy of crisis relocation, and includes investigative efforts related to structural wood connections, wood roof trusses and panelized systems, manufactured floor and roof joists, radiation protection for walls, the analysis of basement walls under dynamic loading, and a prediction method for the punching of concrete slabs. The results of this study are being used in the development of a prediction methodology for comparative selection of shelter spaces.

54374 **(BNL—33590) Automation of a cryogenic facility by commercial process-control computer.** Sondericker, J.H.; Campbell, D.; Zantopp, D. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 7p. (CONF-830841—17). NTIS, PC A02/MF A01. Order Number DE83017766.

From Cryogenic engineering conference and international cryogenic materials conference; Colorado Springs, CO, USA (15 Aug 1983).

Portions are illegible in microfiche products.

To insure that Brookhaven's superconducting magnets are reliable and their field quality meets accelerator requirements, each magnet is pre-tested at operating conditions after construction. MAGCOOL, the production magnet test facility, was designed to perform these tests, having the capacity to test ten magnets per five day week. This paper describes the control aspects of MAGCOOL and the advantages afforded the designers by the implementation of a commercial process control computer system.

54375 **(BNL—33592) Helium refrigerator with features for supercritical-pressure cooling.** Wu, K.C.; Brown, D.P.; Schlafke, A.P.; Sondericker, J.H. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 8p. (CONF-830841—18). NTIS, PC A02/MF A01. Order Number DE83017759.

From Cryogenic engineering conference and international cryogenic materials conference; Colorado Springs, CO, USA (15 Aug 1983).

The cold end of the helium refrigerator with features for supercritical pressure cooling where it deviates from a conventional refrigerator is described. Two methods of transporting cooling from the load are considered. The first uses a cold circulating pump to circulate helium around the load. The second simply uses the J-T flow from the refrigerator to transport cooling. Measurements have been performed to verify refrigerator capacity. The refrigerator configuration is illustrated, and results of the capacity of the refrigerator and performance data for the ejector and the circulating pump are presented. Operating experience is discussed. (LEW)

54376 **(BNL—33593) Combined cold compressor/ejector helium-refrigerator cycle.** Schlafke, A.P.; Brown, D.P.; Wu, K.C. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 6p. (CONF-830841—12). NTIS, PC A02/MF A01. Order Number DE83017764.

From Cryogenic engineering conference and international cryogenic materials conference; Colorado Springs, CO, USA (15 Aug 1983).

A series of tests is reported as part of the program to demonstrate the feasibility of cold compressors as related to a large refrigerator. The use of a cold compressor in series with an ejector has been shown as an effective way to produce low pressure in a helium refrigeration system. Compared with a system which uses an ejector alone, the combined cold compressor and ejector system produces a lower temperature on the same load or more cooling at the same temperature. (LEW)

54377 (CONF-821005—, pp V.82-V.89) **Intervention device for use in a hostile environment.** Testemale, G.; Andreucci, P.; Bozec, C. (CEN, Fontenay-aux-Roses, France). 1982. NTIS, PC A99/MF A01.

From DOE international decommissioning symposium; Seattle, WA, USA (10 Oct 1982).

This report describes the technique used by the Fontenay-aux-Roses Research Centre to solve problems of intervention in an environment strongly contaminated with high-activity α emitters. A description of the system used and of how it operates will be followed by an account of the work it has made possible while in service and of its physiological repercussions on the operators. 2 figures.

54378 (CONF-830528—Summ., pp II.A.3) **Protecting against failure by brittle fracture in ferritic steel shipping containers.** Schwartz, M.W.; Langland, R.T. (Lawrence Livermore National Lab., CA). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54379 (CONF-830528—Summ., pp II.A.4-II.A.5) **Application of linear-elastic fracture mechanics concepts to ferritic spent fuel shipping casks.** McConnell, P. (Fracture Control Corp., Goleta, CA); Wullaert, R.; Trujillo, A. 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54380 (CONF-830528—Summ., pp II.A.6-II.A.7) **Mechanical requirements for materials of accident proof packagings of radioactive materials.** Aurich, D.; Helms, R.; Ziebs, J.; Droste, B. (Bundesanstalt fuer Materialpruefung, Berlin, Germany). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54381 (CONF-830528—Summ., pp II.B.3) **Properties of nodular ductile graphite cast iron used in GNS-manufactured spent fuel casks.** Rollins, J. (GNS, Roswell, GA). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54382 (CONF-830528—Summ., pp II.B.4-II.B.5) **TN 1300 cask casting process and material qualification.** Anspach, W. (Transnuklear GmbH, Hanau, Germany); Wolters, D. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54383 (CONF-830528—Summ., pp II.B.6-II.B.7) **Design criteria for nodular cast iron shipping containers.** Schwartz, M.W.; Boyce, L. (Lawrence Livermore National Lab., CA). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54384 (CONF-830528—Summ., pp II.B.8-II.B.9) **Assessment of cast irons for structural components in nuclear material transportation systems.** VanDenAvyle, J.A.; Salzbrenner, R.; Trujillo, A.A. (Sandia National Labs., Albuquerque, NM). 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54385 (CONF-830528—Summ., pp IV.7-IV.8) **Qualification and certification criteria of casks for the intermediate dry storage of spent fuel in the Federal Republic of Germany.** Droste, B.; Huebner, H.W.; Probst, U. (Bundesanstalt fuer Materialpruefung, Berlin, Germany). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54386 (CONF-830528—Summ., pp V.3-V.4) **Water radiolysis study: application to the transportation casks.** Abassin, J.J.; Blanchard, R.J. (Centre d'Etudes Nucleaires de Grenoble, France). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54387 (CONF-830528—Summ., pp V.5) **TN 17/3: a cask designed for the transport of irradiated fuel to a PIE facility.** Kirchner, B.; Blum, P. (Transnucleaire, Paris, France). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54388 (CONF-830528—Summ., pp V.6) **Design of radioactive material shipping packaging for low-velocity puncture resistance.** Nickell, R.E. (Electric Power Research Inst., Palo Alto, CA); May, R.A. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54389 (CONF-830528—Summ., pp V.7-V.8) **Puncture protection for the TRUPACT system.** Vigil, M.G. (Sandia National Labs., Albuquerque, NM); Deveney, J.E.; Yoshimura, H.R.; Duffey, T.A.; Cheresh, M.H.; Zimmer, A. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54390 (CONF-830528—Summ., pp V.9-V.10) **Interactions between crush conditions and fire resistance for Type B packages less than 500 kg.** Huebner, H.W.; Masslowski, J.P. (Bundesanstalt fuer Materialpruefung, Berlin, Germany). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54391 (CONF-830528—Summ., pp V.11-V.12) **Testing to define the sensitivity of small Type B packagings to the proposed IAEA crush test requirement.** Diggs, J.M.; Leisher, W.B.; Pope, R.B.; Trujillo, A.A. (Sandia National Labs., Albuquerque, NM). 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54392 (CONF-830528—Summ., pp V.13-V.16) **Justification and advantages of crushing tests compared with fall tests and the modification of existing regulations.** Chevalier, G. (Centre d'Etudes Nucleaires, Saclay, France); Gilles, P.; Pouard, P. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54393 (CONF-830528—Summ., pp V.17-V.18) **Test and analysis on impact characteristics evaluation of nuclear fuel packaging loaded on vehicle.** Sakamoto, M.; Shimoda, A.; Uchino, M. (Mitsubishi Metal Corp., Tokyo, Japan). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54394 (CONF-830528—Summ., pp D.I.3-D.I.4) **New method to repair uranium hexafluoride cylinders.** Steinebach, E.F.M. (Urenco, Almelo, Netherlands). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54395 (CONF-830528—Summ., pp D.I.5-D.I.6) **Design and testing of a plutonium oxide transport container.** Arnal, T. (Centre d'Etudes Nucleaires de Cadarache, France); Auchapt, P.; Ferlay, A.; Marchal, P. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54396 (CONF-830528—Summ., pp D.I.7-D.I.8) **Thermal diode cooling fin concept.** Lyall, H.G.; Watts, J. (Berkeley Nuclear Labs., Gloucestershire, England). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54397 (CONF-830528—Summ., pp D.I.9-D.I.10) **Development of plutonium oxide power packaging (PUCON type packaging).** Oshima, H.; Kubo, M. (Power Reactor & Nuclear Fuel Development Corp., Tokyo, Japan). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54398 (CONF-830528—Summ., pp D.I.17-D.I.18) **Development of a new DOT-7A, Type A corrugated metal waste container at the Rocky Flats Plant.** Peter, K.G.; Brugger, R.P. (Rocky Flats Plant, Golden, CO). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54399 (CONF-830528—Summ., pp D.I.19-D.I.20) **Design of new overpacks for UF_6 cylinders.** Housholder, W.R. (Nuclear Containers, Inc., Elizabethton, TN). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54400 (CONF-830528—Summ., pp D.I.21-D.I.22) **TRansuranic PACkage Transporter (TRUPACT) system design status and operational support equipment.** Romesberg, L.E. (Sandia National Labs., Albuquerque, NM); Pope, R.B.; Meyer, R.; Johanson, N.W. 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54401 (CONF-830528—Summ., pp D.I.23-D.I.24) **Packaging test facilities at Sandia National Laboratories.** Allen, G.C.; Bickel, D.C.; Mathews, F.H. (Sandia National Labs., Albuquerque, NM). 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54402 (CONF-830528—Summ., pp D.I.27) **Drop test facility available to private industry.** Shappert, L.B.; Box, W.D. (Oak Ridge National Lab., TN). 1983. NTIS, PC A21/MF A01. Contract W-7405-ENG-26.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54403 (CONF-830528—Summ., pp D.I.28-D.I.29) **One dimensional foam thermal modeling of TRUPACT wall section.** Laub, B. (Acurex Corp., Mountain View, CA); Chiba, F.; Fretter, E.F.; Beck, R.A.S.; Yoshimura, H.R.; Auerbach, I. 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54404 (CONF-830528—Summ., pp D.I.30-D.I.31) **Argentine developments for a Type B cask.** San Pedro, M. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54405 (CONF-830528—Summ., pp VII.3-VII.4) **Some design considerations for cask handling at large-scale shipping and receiving facilities.** Shirley, C.G. (Sandia National Labs., Albuquerque, NM); Yount, J.A.; Berger, J.D. 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54406 (CONF-830528—Summ., pp VIII.B.3-VIII.B.4) **Testing of the Model 48-14 overpack for UF_6 cylinders.** Stitt, D.H. (Paducah Gaseous Diffusion Plant, KY). 1983. NTIS, PC A21/MF A01. Contract W-7405-ENG-26.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54407 (CONF-830528—Summ., pp XI.3) **Containment system evaluation.** Lake, W.H. (Nuclear Regulatory Commission, Washington, DC). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54408 (CONF-830528—Summ., pp XI.4-XI.5) **Criteria for and proof of leaktightness concerning casks for dry transport and intermediate storage of spent LWR-fuel elements.** Kowalewsky, H. (Bundesanstalt fuer Materialpruefung, Berlin, Germany). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54409 (CONF-830528—Summ., pp XI.6-XI.7) **Correlation between measured gas leaks and possible loss of contents from radioactive materials packagings.** Andersen, J.A. (Sandia National Labs., Albuquerque, NM). 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54410 (CONF-830528—Summ., pp XI.8-XI.9) **Helium/solid powder O-ring leakage correlation experiments.** Leisher, W.B. (Sandia National Labs., Albuquerque, NM); Weissman, S.H.; Tallant, D.R.; Kubo, M. 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54411 (CONF-830528—Summ., pp XI.10-XI.11) **Factors influencing the design and assessment of elastomer seals for nuclear fuel transport flasks.** Chivers, T.C.; George, A.F. (Berkeley Nuclear Labs., England). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54412 (CONF-830528—Summ., pp XI.12-XI.13) **Fundamental studies on the performance of O-ring seal for cask.** Ebisu, T.; Yamamoto, M.; Maekawa, H.; Onodera, A. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54413 (CONF-830528—Summ., pp XI.14) **In-situ permeation tests of elastomeric O-ring seals.** Leisher, W.B.; Burns, F.B.; Rodacy, P.J.; Trujillo, A.A. (Sandia National Labs., Albuquerque, NM). 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54414 (CONF-830528—Summ., pp XI.15) **Metallic seal testing.** Leisher, W.B.; Trujillo, A.A. (Sandia National Labs., Albuquerque, NM). 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54415 (CONF-830528—Summ., pp D.II.3-D.II.4) **Behaviour of UF_6 package in fire: comparison of calculations with experiment.** Duret, B.; Bonnard, J.C. (CEA-CEN, Grenoble, France). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54416 (CONF-830528—Summ., pp D.II.5-D.II.6) **Thermal trials on a water-cooled LWR flask.** Burgess, M.H. (United Kingdom Atomic Energy Authority, Winfrith, England); Spiller, G.T.; Livesey, E. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54417 (CONF-830528—Summ., pp D.II.7) **Family of casks for transport of LWR spent fuel.** Sert, G. (Transnucleaire, Paris, France). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54418 (CONF-830528—Summ., pp D.II.8-D.II.9) **Widely useful stainless steel forging B(U) packaging.** Yokoyama, H.; Higashi, K.; Takada, K.; Nagahama, H.; Tamamura, T. (Kobe Steel, Ltd., Hyogo, Japan). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54419 (CONF-830528—Summ., pp D.II.16-D.II.17) **Development of a transport cask for contaminated steam generators.** Temus, C.J. (Chem-Nuclear Systems, Inc., Bellevue, WA). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54420 (CONF-830528—Summ., pp D.II.20-D.II.21) **Operation and maintenance of the T-3 cask system.** Hussey, M.W. (Hanford Engineering Development Lab., Richland, WA); Berger, J.D.; Peterson, J.M. 1983. NTIS, PC A21/MF A01. Contract AC06-76FF02170.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54421 (CONF-830528—Summ., pp D.II.25-D.II.26) **Design concept for a defense high-level waste shipping cask: truck.** Moore, R.L. (GA Technologies, San Diego, CA); Zimmer, A.; Shirley, C.G.; Romesberg, L.E.; Wilmot, E.L. 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54422 (CONF-830528—Summ., pp D.II.27-D.II.28) **Packaging test capabilities of the SNL aerial cable facility.** Uncapher, W.L. (Sandia National Labs., Albuquerque, NM). 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54423 (CONF-830528—Summ., pp XIV.3-XIV.4) **Drop from the reactor building crane: an event covered by the 9-m drop test requirement.** Wieser, K.E.; Jais, M.; Holzloehner, U. (Bundesanstalt fuer Materialpruefung, Berlin, Germany). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54424 (CONF-830528—Summ., pp XIV.5) **Experimental impact and puncture evaluation of the prototype quarter scale TRU transport package.** Vigil, M.G. (Sandia National Labs., Albuquerque, NM); Plonski, B.; Grenier, R. 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54425 (CONF-830528—Summ., pp XIV.6-XIV.7) **Study of the influence of target material on impact damage.** Blythe, R.A. (Central Electricity Generating Board, Gloucester, England); Miles, J.C.; Holt, P.J. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54426 (CONF-830528—Summ., pp XIV.8-XIV.9) **Non-shielded transport package impact response to unyielding and semi-yielding surfaces.** Gablin, K.A.; Jefferson, R.M.; Pope, R.B.; Vigil, M.G.; Joseph, B.J.; Yoshimura, H.R. 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54427 (CONF-830528—Summ., pp XIV.10) **Experimental and analytical program to evaluate packaging and target hardness as related to nuclear waste transportation systems.** Sutherland, S.H. (Sandia National Labs., Albuquerque, NM); Allen, G.C.; Yoshimura, H.R.; Huerta, M. 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54428 (CONF-830528—Summ., pp XIV.11-XIV.12) **Feasibility study for scaling ferritic shipping casks for drop-tests.** McConnell, P. (Fracture Control Corp., Goleta, CA); Jones, J.W.; Nickell, R. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54429 (CONF-830528—Summ., pp XV.10-XV.11) **Large transport containers for nuclear reactor decommissioning waste.** Price, M.S.T. (UK Atomic Energy Authority, Winfrith, England); Lafontaine, I.; Dierckx, L.; Deramaix, P.; Demeester, J.; Pflugrad, K.; Wright, B. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54430 (CONF-830528—Summ., pp XVII.3-XVII.4) **Design of a transportation cask for irradiated CANDU fuel.** Gavin, M.E.; Nash, K.E. (Ontario Hydro, Toronto). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54431 (CONF-830528—Summ., pp XVII.5-XVII.6) **TN cask capabilities for transport of extended burnup fuel assemblies.** Macek, V.V.; Mason, M.E.; Guerra, V.G.; Goldmann, K. (Transnuclear, Inc., White Plains, NY). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54432 (CONF-830528—Summ., pp XVII.7-XVII.8) **Conceptual design of large spent fuel shipping casks for older PWR fuel.** Bucholz, J.A. (Oak Ridge National Lab., TN). 1983. NTIS, PC A21/MF A01. Contract W-7405-ENG-26;AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54433 (CONF-830528—Summ., pp XVII.9-XVII.10) **TN-12Y packaging for rail transport of irradiated fuel.** Nolan, D.J.; Goldman, K. (Transnuclear, Inc., White Plains, NY). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54434 (CONF-830528—Summ., pp XVII.11-XVII.12) **Selection and certification of materials for casks intended for the transport and intermediate storage of spent fuel.** Droste, B.; Huebner, H.W.; Probst, U. (Bundesanstalt fuer Materialpruefung, Berlin, Germany). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54435 (CONF-830528—Summ., pp XVII.15) **Upgrading the DOT 6M-2R shipping package.** Chalfant, G.G. (Savannah River Plant, Aiken, SC). 1983. NTIS, PC A21/MF A01. Contract AC09-76SR00001.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54436 (CONF-830528—Summ., pp XVIII.6-XVIII.7) **Thermal analysis for the design of a CANDU irradiated fuel transportation cask.** Taralis, D.; Nash, K.E. (Ontario Hydro, Toronto). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54437 (CONF-830528—Summ., pp XVIII.8-XVIII.10) **Heat dissipation by natural convection of circumferentially finned spent fuel transport casks.** Doroszlai, P.G.K. (Electrowatt Engineering Services Ltd., Zurich, Switzerland). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54438 (CONF-830528—Summ., pp XVIII.13-XVIII.14) **Experimental and numerical study of the thermal tests on the spent fuel shipping cask (50-ton-class cask) using a furnace.** Tasuda, M.; Kobayashi, S.; Yamakawa, H.; Abe, H. (Central Research Inst. of Electric Power Industry, Chiba, Japan). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54439 (CONF-830528—Summ., pp XVIII.15-XVIII.16) **Facility for repeatable fire testing.** Gill, W. (Sandia National Labs., Albuquerque, NM). 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54440 (CONF-830528—Summ., pp XVIII.17) **Analytical/experimental program to assess thermal response to geometrically simulated casks to engulfing fires.** Nelsen, J.M.; Vigil, M.G.; Diggs, J.M.; Trujillo, A.A. (Sandia National Labs., Albuquerque, NM). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54441 (CONF-830528—Summ., pp D.III.7-D.III.8) **Design and fabrication of 100-ton-class spent fuel shipping cask (100-ton cask).** Abe, H. (Central Research Inst. of Electric Power Industry, Tokyo, Japan); Yasuda, M.; Fukuda, S.; Amano, K. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54442 (CONF-830528—Summ., pp D.III.19) **FFTF disposable solid waste cask: a study in the effectiveness of concrete as a packaging material.** Goetsch, S.D. (Nuclear Packaging, Inc., Tacoma, WA); Thomson, J.D. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54443 (CONF-830528—Summ., pp D.III.20-D.III.21) **Development of a large fire test facility for packaging thermal testing.** Yoshimura, H.R.; Uncapher, W.L.; Moya, J.; Gill, W.; Allen, G.C. (Sandia National Labs., Albuquerque, NM). 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54444 (CONF-830528—Summ., pp D.III.26) **Analysis of nuclear material shipping containers using a three-dimensional, dynamic finite element program.** May, R.A.; Preece, D.S.; Lewis, B.A. (Sandia National Labs., Albuquerque, NM). 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54445 (CONF-830528—Summ., pp XIX.7-XIX.8) **Economic evaluation of nuclear waste transportation casks.** Schneringer, P.E. (GA Technologies, Inc., San Diego, CA); Joy, D.S.; Cashwell, J.W. 1983. NTIS, PC A21/MF A01. Contract W-7405-ENG-26;AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54446 (CONF-830528—Summ., pp XX.3-XX.4) **Fatigue design of TRUPACT-1.** Grenier, R.M.; Tow, D.; Villareal, R.J. (GA Technologies Inc., San Diego, CA). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54447 (CONF-830528—Summ., pp XX.5-XX.6) **Thermal analysis of lead pour fabrication process for a spent fuel shipping cask.** Martin, R.W. (Lawrence Livermore National Lab., CA). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54448 (CONF-830528—Summ., pp XX.7-XX.8) **Stress analysis for a spent fuel shipping cask.** Woo, H.H.; Gerhard, M.; Langland, R.T. (Lawrence Livermore National Lab., CA). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54449 (CONF-830528—Summ., pp XX.9) **Three-dimensional finite element analysis of radioactive material packagings.** Sutherland, S.H. (Sandia National Labs., Albuquerque, NM); Huerta, M. 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54450 (CONF-830528—Summ., pp XX.10-XX.11) **Two- and three-dimensional dynamic analyses of DHLW casks.** Osborne, D.M. (GA Technologies Inc., San Diego, CA); Grenier, R.M.; Rasmusson, P.C.; Nickell, R.E. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54451 (CONF-830528—Summ., pp XX.12-XX.13) **Structural and thermal code evaluation.** Trujillo, A.A. (Sandia National Labs., Albuquerque, NM); Cline, D.D.; Nelsen, J.; Lewis, B.; Budden, M.; Friley, J. 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54452 (CONF-830528—Summ., pp XXI.3-XXI.4) **Guide to quality assurance measures for manufacturing and use of RAM packagings.** Wieser, K.E. (Bundesanstalt fuer Materialpruefung, Berlin, Germany); Roedel, R. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54453 (CONF-830528—Summ., pp XXI.5) **Discussion of Regulatory Guide 7.10, emphasizing the graded approach for establishing QA programs.** Gordon, L.L.; Lake, W.H. (Nuclear Regulatory Commission, Washington, DC). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54454 (CONF-830528—Summ., pp XXI.6-XXI.7) **Three years of experience and future prospects in maintenance and reinspection on LWR-irradiated fuel transport flasks.** Lazarevitch, S. (Nuclear Transport Ltd., La Hague, France); Lenail, B.; Bernard, H. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54455 (CONF-830528—Summ., pp XXI.8-XXI.9) **Hands-off technique for the internal decontamination of fuel transport flasks.** Bridle, D.A.; Bird, E.J. (United Kingdom Atomic Energy Authority, Winfrith, England). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54456 (CONF-830528—Summ., pp XXI.10-XXI.11) **Quality assurance in packaging design through the peer review process.** Andersen, J.A. (Sandia National Labs., Albuquerque, NM). 1983. NTIS, PC A21/MF A01. Contract AC04-76DP00789.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54457 (CONF-830528—Summ., pp XXI.12-XXI.13) **Elastomere gasket: a black sheep for quality assurance measures.** Wieser, K.E.; Budaeus, A.; Probst, U. (Bundesanstalt fuer Materialpruefung, Berlin, Germany). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54458 (CONF-830528—Summ., pp XXIII.5-XXIII.6) **Criticality safety analysis of transport packages for fissile materials and transport index evaluation.** Gualdrini, G.F.; Mancioppi, S. (ENEA, Rome, Italy). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54459 (CONF-830528—Summ., pp XXIII.8-XXIII.9) **Experimental and analytical study on shielding of spent fuel shipping cask.** Maki, Y. (Central Research Inst. of Electric Power Industries, Chiba, Japan); Yasuda, Y.; Inoue, M.; Abe, H.; Sekiguchi, A.; Nakazawa, S.; Hasegawa, K.; Iguchi, T.; Ueki, K.; Tamakoshi, H. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54460 (CONF-830528—Summ., pp XXIII.10-XXIII.11) **Safety analysis code systems for spent fuel cask in JINS.** Nomura, Y.; Mizuta, H.; Noguchi, H. (Inst. of Nuclear Safety, Tokyo, Japan). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54461 (CONF-830528—Summ., pp XXIII.12-XXIII.13) **Standaridized analyses of nuclear shipping containers.** Parks, C.V.; Hermann, O.W.; Petrie, L.M.; Hoffman, T.J.; Tang, J.S.; Landers, N.F.; Turner, W.D. (Oak Ridge National Lab., TN). 1983. NTIS, PC A21/MF A01. Contract W-7405-ENG-26.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54462 (CONF-830528—Summ., pp XXIII.14-XXIII.15) **Standard problem exercise to validate criticality codes for spent LWR fuel transport container calculations.** Whitesides, G.E. (Oak Ridge National Lab., TN); Stephens, M.E. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54463 (CONF-830528—Summ., pp XXIV.9-XXIV.10) **Operational experience with the HZ-75T spent fuel shipping cask.** Onodera, A.; Nishikawa, A.; Ino, H.; Ozaki, S. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54464 (CONF-830528—Summ., pp XXIV.13-XXIV.14) **Packaging of US Department of Energy toll enriched UF_6: experience, responsibilities, and improvements.** Pryor, W.A. (Dept. of Energy, Oak Ridge, TN). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54465 (CONF-830528—Summ., pp XXVI.3-XXVI.4) **Invesigations on shock absorbers for Type B packagings.** Wieser, K.E. (Bundesanstalt fuer Materialpruefung, Berlin, Germany); Masslowski, J.P.; Sieber, R. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54466 (CONF-830528—Summ., pp XXVI.5-XXVI.6) **Development of a toroidal shell-type shock absorber for an irradiated fuel shipping cask.** Sugita, Y.; Mochizuki, S. (Mitsui Engineering & Shipbuilding Co., Ltd., Tokyo, Japan). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54467 (CONF-830528—Summ., pp XXVI.7-XXVI.8) **Analysis of the behavior under impact loads of a shell-type shock absorber for LWR spent fuel transport packaging.** Aquaro, D.; Forasassi, G. (Pisa Univ., Italy). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54468 (CONF-830528—Summ., pp XXVI.9-XXVI.10) **Analysis method for the design of transport packagings shock absorbing end covers.** Nolan, D.J. (Transnuclear, Inc., White Plains, NY); Miller, C.; Fernandez, C. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54469 (CONF-830528—Summ., pp XXVI.11-XXVI.12) **Impact limiter design methodology.** Meinert, N.M. (Nuclear Assurance Corp., Atlanta, GA); Wells, A.H. 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54470 (CONF-830528—Summ., pp XXVI.13-XXVI.14) **Shock response of flexible polyurethane foams.** Szanto, M.; Yossifon, S. (Nuclear Research Centre, Negev, Israel). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54471 (CONF-830841—14) **a-c losses for 19-strand subcables for the ANL 3.3-MJ coil.** Kim, S.H.; Dawson, J.W.; McGhee, D.G.; Shen, S.S. (Argonne National Lab., IL (USA); Oak Ridge National Lab., TN (USA)). 1983. Contract W-31-109-ENG-38. 9p. NTIS, PC A02/MF A01. Order Number DE83017138.

From Cryogenic engineering conference and international cryogenic materials conference; Colorado Springs, CO, USA (15 Aug 1983).

From the time constant and the hysteresis loss measurements of the subcables, it is estimated that approximately 60% of the ac losses of the ANL 3.3 MJ coil at 6 T/s of the central field are due to the losses within the 19-strand subcable itself. The remaining 40% of the losses seem to come mainly from the coupling among the weakly insulated 19-strand subcables in the final cable. The outer sheath copper wires of the subcable improve the stability of the subcable, especially when it is soldered. It is shown, however, that the ac losses are not increased significantly due to the copper stabilizer.

54472 (CONF-830841—15) **Consequences of shorted turns in a superconducting magnet.** Turner, L.R. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 9p. NTIS, PC A02/MF A01. Order Number DE83017933.

From Cryogenic engineering conference and international cryogenic materials conference; Colorado Springs, CO, USA (15 Aug 1983).

The computer code SHORTURN performs a coupled thermal and magnetic analysis of a superconducting magnet with a shorted turn or turns. The analysis is briefly described and applied to the case of multiple shorted turns. Analyses are taken from cases in the Large Coil Program, and cover both high and low resistance shorts and discharging magnets. (LEW)

54473 (KEK—80-15, pp 7-10) **Manufacture of mirrors by NC machining of EEM.** Hongo, T.; Azuma, Y.; Kato, H.; Hoshino, H. (National Lab. for High Energy Physics, Oho, Ibaraki (Japan)). Feb 1981. (In Japanese). NTIS (US Sales Only), PC A03/MF A01. (CONF-8010331—).

From 3. symposium on machine work of scientific instruments; Oho, Japan (24 Oct 1980).

In the X-ray optical system for the photon factory facility being constructed now in the National Laboratory for High Energy Physics, total reflection mirrors occupy important position. The shapes of mirrors are both plane and curved surface, and the sizes are various. Especially concerning hard X-ray, the required accuracy of the shapes and surface roughness is high. Thereupon mirrors were machined by elastic emission machining (EEM) developed by Mori et al. of Osaka University, and the flatness and surface roughness were examined. The materials machined were Pyrex and copper, the mirror finish of which is difficult. The results are reported. In this machining method, the liquid in which very fine powder is uniformly dispersed and suspended in water was used. By approaching a rotating urethane ball to a work surface, the gap of about 1 μm was formed between them utilizing fluid bearing-like flow arising there. The machining was carried out by colliding the fine particles in suspension to a minute region of the work surface. In order to obtain an arbitrary curved surface, the numerical control according to the variable controling the amount of machining was made. In the case of glasses, the amount of machining was able to be controlled to about 0.01 μm. As for polycrystalline copper, the machining was difficult, and the suitable conditions must be sought hereafter.

54474 (KEK—81-6) **Superconducting magnet activities at CEN Saclay. A brief summary.** Lesmond, C. (National Lab. for High Energy Physics, Oho, Ibaraki (Japan)). Jul 1981. 57p. NTIS (US Sales Only), PC A04/MF A01. Order Number DE83703004.

The activities in superconducting magnets at DPhPE/Saclay spread over a wide range from DC magnets mainly for particle and nuclear physics and also for other fields of research, pulsed magnets for particle accelerators and for a controlled fusion tokamak machine. The superconducting magnets designed during recent years involve a variety of conductor types, winding schemes, materials and cooling modes, including the use of superfluid helium.

54475 (LA-UR—83-2351) **Experiment to determine properties of packed particle beds and regenerators at cryogenic temperatures.** Barclay, J.A.; Overton, W.C. Jr.; Stewart, W.F.; Sarangi, S. (Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. 9p. (CONF-830841—5). NTIS, PC A02/MF A01. Order Number DE83017320.

From Cryogenic engineering conference and international cryogenic materials conference; Colorado Springs, CO, USA (15 Aug 1983).

The testing of the properties of packed-particle beds and regenerators at cryogenic temperatures as low as 4 K is an essential part of the magnetic refrigeration research and development program at the Los Alamos National Laboratory. We envision magnetic refrigeration and heat pump systems operating in various ranges from 4 K to ambient temperature and above. Only pressurized helium gas appears suitable as the heat exchange fluid for the low-temperature applications. Because published data on the properties of porous beds at low temperatures is sparse, we have found it necessary to develop an experimental test apparatus to study the properties of various configurations of beds and regenerators. Two of the well-known methods for such studies are the steady-enthalpy-flux method and the single-blow transient method. We have developed an experimental system in which gas flow can be suddenly switched to an alternate better (or colder) flow in step-function fashion at temperatures from 4 to 300 K. This apparatus will yield information on steady-state heat transfer and friction factors as well as on the transient behavior. Such information is very important to the design of high-efficiency magnetic refrigeration systems. This paper describes this experimental apparatus and presents the results and analysis of recent measurements on packed-particle beds in the liquid helium and liquid nitrogen temperature ranges.

54476 (LBL—16031, pp 329-332) **HVEM study of Nb_3Sn multifilamentary superconducting wires.** Hascicek, Y.S.; Goringe, M.J.; Nourbakhsh, S. (Univ. of Oxford, England). Jun 1983. NTIS, PC A19/MF A01. (CONF-830819—).

From 7. international conference on high voltage microscopy; Berkeley, CA, USA (16 Aug 1983).

The HVEM has been used to investigate the microstructure of Nb_3Sn multifilamentary superconducting wires using both transverse and longitudinal sections. Complete Nb_3Sn and bronze grains and the Nb/Nb_3Sn and Nb_3Sn/Cu-Sn interfaces have been viewed at the same time. The effects of different heat treatments have been studied and the resulting microstructures found to be significantly different from previous descriptions.

54477 **(LBL—16470) Forced two-phase cooling of the TPC superconducting solenoid.** Green, M.A.; Barrera, F.; Petersen, H.; Rago, C.E.; Rinta, R.I.; Talaska, D.; Taylor, J.D.; van Slyke, H.; Watt, R.D. (Lawrence Berkeley Lab., CA (USA); Stanford Linear Accelerator Center, CA (USA)). Aug 1983. Contract AC03-76SF00098. 11p. (CONF-830841—21). NTIS, PC A02/MF A01. Order Number DE83017749.

From Cryogenic engineering conference and international cryogenic materials conference; Colorado Springs, CO, USA (15 Aug 1983).

Portions are illegible in microfiche products.

This paper describes the cryogenic tests of the TPC 2-meter-diameter superconducting solenoid on a 200 W refrigerator with gas-bearing turbines. The solenoid is cooled with two phase helium in forced flow around the superconducting winding. The two-phase helium was circulated using either the J-T circuit flow or a bellows type liquid helium pump. The particular problems associated with running a variable load on a gas-bearing turbine refrigerator are discussed.

54478 **(UCRL—89738) Design and construction of a large, vertical-axis diamond turning machine.** Donaldson, R.R.; Patterson, S.R. (Lawrence Livermore National Lab., CA (USA)). Aug 1983. Contract W-7405-ENG-48. 7p. (CONF-830874—24). NTIS, PC A02/MF A01. Order Number DE83017629.

From 27. annual international technical symposium on high speed photography, videography and photonics; San Diego, CA, USA (21 Aug 1983).

A 64-inch swing, vertical-spindle-axis precision lathe has been constructed. The machine incorporates a multiple-path laser feedback system, capacitance gauges, a 32-bit computer and capstan drives to provide two axes of tool motion in a 32-inch radius by 20-inch length working volume. Dimensional stability of critical components is achieved through the use of low coefficient-of-thermal-expansion materials and temperature-controlled heat sinks. Projected accuracy of the machine is approximately one microinch rms.

54479 **(UCRL—89756) Precision support of annular optics.** Roblee, J.W.; Stillman, D.W.; Patterson, S.R. (Lawrence Livermore National Lab., CA (USA)). Aug 1983. Contract W-7405-ENG-48. 10p. (CONF-830874—23). NTIS, PC A02/MF A01. Order Number DE83017473.

From 27. annual international technical symposium on high speed photography, videography and photonics; San Diego, CA, USA (21 Aug 1983).

A quantitative description of the deformation of annular optical element subject to external forces has been developed. Expressions applicable when the width of the element is small compared to its radius provide distortion data for both free rings and rings supported on thin-wall cylinder segments (tangent flanges). This data may be used to guide the design of fixtures for diamond turning large annular optics.

54480 **Apparatus and method for generating mechanical waves.** Allensworth, D.L.; Chen, P.J. US Patent Application 6-436,557. 25 Oct 1982. 20p. Contract AC04-76DP00789.

Mechanical waves are generated in a medium by subjecting an electromechanical element to an alternating electric field having a frequency which induces mechanical resonance therein and is below any electrical resonance frequency thereof.

54481 **Ultrasonic-impact grinder system.** Calkins, N.C. US Patent Application 6-430,105. 30 Sep 1982. 11p. Contract W-7405-ENG-36.

The disclosure relates to an ultrasonic impact grinding apparatus utilizing a counterweight to set an unloaded friction free condition. An added weight is used to optimize feed rate in accordance with the material to be cut, tool size and the like.

54482 **Rolling-cuff flexible bellows.** Lambert, D.R. US Patent Application 6-425,139. 27 Sep 1982. 25p. Contract W-7405-ENG-48.

A flexible connector apparatus used to join two stiff non-deformable members, such as piping, is described. The apparatus is provided with one or more flexible sections or assemblies each utilizing a bellows of a rolling cuff type connected between two ridge members, with the bellows being supported by a back-up ring, such that only the curved end sections of the bellows are unsupported. Thus, the bellows can be considered as being of a tube-shaped configuration and thus have high pressure resistance. The components of the flexible apparatus are sealed or welded one to another such that it is fluid tight.

54483 **Liquid-blocking check valve.** Merrill, J.T. US Patent Application 6-425,142. 27 Sep 1982. 10p. Contract W-7405-ENG-48.

A liquid blocking check valve useful particularly in a pneumatic system utilizing a pressurized liquid fill chamber. The valve includes a floatable ball disposed within a housing defining a chamber. The housing is provided with an inlet aperture disposed in the top of said chamber, and an outlet aperture disposed in the bottom of said chamber in an offset relation to said inlet aperture and in communication with a cutaway side wall section of said housing.

54484 **Laterally bendable belt conveyor.** Peterson, W.J. US Patent Application 6-422,796. 24 Sep 1982. 48p.

An endless, laterally flexible and bendable belt conveyor particularly adapted for coal mining applications in facilitating the transport of the extracted coal up- or downslope and around corners in a continuous manner is disclosed. The conveying means includes a flat rubber belt reinforced along the middle portion thereof along which the major portion of the belt tension is directed so as to cause rotation of the tubular shaped belt when trammed around lateral turns thus preventing excessive belt bulging distortion between adjacent belt supports which would inhibit belt transport. Pretension induced into the fabric reinforced flat rubber belt by conventional belt take-up means supports the load conveyed when the belt conveyor is making lateral turns. The carrying and return portions of the belt are supported and formed into a tubular shape by a plurality of shapers positioned along its length. Each shaper is supported from above by a monorail and includes clusters of idler rollers which support the belt. Additional cluster rollers in each shaper permit the belt supporting roller clusters to rotate in response to the belt's operating tension imposed upon the cluster rollers by induced lateral belt friction forces. The freely rotating roller clusters thus permit the belt to twist on lateral curves without damage to itself while precluding escape of the conveyed material by effectively enclosing it in the tube-shaped, inner belt transport length.

54485 **Braking system.** Norgren, D.U. US Patent Application 6-422,512. 23 Sep 1982. 11p. Contract W-7405-ENG-48.

A balanced braking system comprising a plurality of braking assemblies located about a member to be braked. Each of the braking assemblies consists of a spring biased piston of a first material fitted into a body of a different material which has a greater contraction upon cooling than the piston material. The piston is provided with a recessed head portion over which is positioned a diaphragm and forming a space therebetween to which is connected a pressurized fluid supply. The diaphragm is controlled by the fluid in the space to contact or withdraw from the member to be braked. A cooling means causes the body within which the piston is fitted to contract more than the piston, producing a tight shrink fit therebetween. The braking system is particularly applicable for selectively braking an arbor of an electron microscope which immobilizes, for example, a vertically adjustable low temperature specimen holder during observation. The system provides balanced braking forces which can be easily removed and re-established with minimal disturbance to arbor location.

54486 **High-pressure liquid chromatographic gradient mixer.** Daughton, C.G.; Sakaji, R.H. US Patent Application 6-415,946. 8 Sep 1982. 12p. Contract W-7405-ENG-48.

A gradient mixer effects the continuous mixing of any two miscible solvents without excessive decay or dispersion of the resultant isocratic effluent or of a linear or exponential gradient. The two solvents are fed under low or high pressure by means of two high performance liquid chromatographic pumps. The mixer com-

prises a series of ultra-low dead volume stainless steel tubes and low dead volume chambers. The two solvent streams impinge head-on at high fluxes. This initial nonhomogeneous mixture is then passed through a chamber packed with spirally-wound wires which cause turbulent mixing thereby homogenizing the mixture with minimum band-broadening.

54487 **Mathematical modeling of high velocity water jets.** Eddingfield, D.L.; Evers, J.L.; Setork, A. (Southern Illinois Univ., Carbondale). pp I.3.1-I.3.14 of Water jet symposium. Wang, F.D.; Ozdemir, L.; Miller, R. (eds.). Golden, CO; Colorado School of Mines Press (1982). (CONF-8104201—). Contract AC22-79PC20091.

From 1. US water jet symposium; Golden, CO, USA (7 Apr 1981).

In the study of the effect of nozzle design and the mechanism of breakage in hydraulic cutting, the flow characteristics of water jets are highly desired. In this paper, the mathematical modeling of the flow field of a high velocity water jet is examined, and a review of the existing literature is presented. It is believed that a complete and an accurate flow field description is possible though a multi-component formulation of the problem. A two-dimensional axisymmetric, multi-component mathematical model is proposed which couples the three flow fields which exist in a water jet, that is, the continuous water flow field, the entrained air flow field, and the droplet flow field. A numerical procedure together with its stability and convergence criteria is proposed for the solution of such a multi-component model.

54488 **Techniques for the measurement of the air-water distribution in the flowfield of a high velocity water jet.** Eddingfield, D.L.; Evers, J.L. (Southern Illinois Univ., Carbondale). pp II.2.1-II.2.9 of Water jet symposium. Wang, F.D.; Ozdemir, L.; Miller, R. (eds.). Golden, CO; Colorado School of Mines Press (1982). (CONF-8104201—). Contract AC22-79PC20091.

From 1. US water jet symposium; Golden, CO, USA (7 Apr 1981).

Beyond a relatively short distance downstream of the nozzle, a high velocity water jet invariably produces a flowfield which consists of a water core, an annular air-water droplet region and an induced external air flow region. The study of the air-water droplet region is essential to a more complete understanding of high velocity water jet flows. Existing experimental techniques employed to measure the phase or component distributions are discussed. In addition, a technique is suggested for use for measurements in a high velocity water jet.

54489 **Development of large-diameter percussive jets.** Nebeker, E.B. (Scientific Associates, Inc., Santa Monica, CA). pp IV.5.1-IV.5.11 of Water jet symposium. Wang, F.D.; Ozdemir, L.; Miller, R. (eds.). Golden, CO; Colorado School of Mines Press (1982). (CONF-8104201—).

From 1. US water jet symposium; Golden, CO, USA (7 Apr 1981).

The cutting and fracturing capabilities of high-speed water jets, along with various practical advantages of hydraulic systems, have prompted much interest in these jets for mining and other applications. The Percussive Jet is a fundamentally different free-jet form with special impact characteristics which can enhance jet effectiveness and applicability. Percussive Jets apply force to rock as a sequence of high-frequency, short-duration impacts, rather than steadily. These Jets can be produced with a conventional, continuous flow system by modulating the discharge, i.e., cycling the discharge rate by a small amount above and below its average. With modulated discharge, the faster part of each cycle overtakes the slower in the free stream. If this process is done properly, the stream becomes bunched instead of uniform and a Percussive Jet is produced. Earlier work has concentrated on small-diameter water jets. Results of the development and testing are summarized. Modulator frequencies (or bunches striking the rock target) have varied from 2000 to 20,000 per second. Nozzle discharge pressures have varied from 2300 to 7200 psig using a flow rate of 9.6 gpm with relatively small nozzles (~ 0.060 inches diameter). Test results showed that Percussive Jets were many times more efficient than ordinary jets and sometimes over an order of magnitude more efficient. These results have been obtained with a variety of materials: coal, brick, sandstone, concrete, coal-associated shale, limestone, and granite. Even more interesting were the apparent rock fracturing or cutting mechanisms. Current work is concerned with jet diameters in the one-half-inch range. Stream bunching could act to conserve jet velocity against air drag and thus increase the maximum range of a jet. The current activities are summarized with a discussion of the modulator, test site design, and an approach to visualizing the inner core of the jet using infrared photography.

54490 **(BNL-tr—1005) Apparatus for contact reaction.** Fukushima, T.; Tachibana, Y.; Matsukawa, S. (Brookhaven National Lab., Upton, NY (USA)). 1979. Contract AC02-76CH00016. Translation of Japanese Patent No. 1979-117,379. 7p. NTIS, PC A02/MF A01. Order Number DE83017723.

Portions are illegible in microfiche products.

An apparatus for contact reaction characterized by having a tower in which a duct is installed with its upper and lower parts being open and a gas disperser which feeds gas bubbles only inside the duct is installed at the lower part of the duct.

4203 Lasers

REFER ALSO TO CITATION(S) 55288

54491 **(AD-A—126366/4) Application of laser resonance saturation to the development of efficient short wavelength lasers. Annual report for period ending 30 Sep 82.** Measures, R.M. (Toronto Univ., Ontario (Canada). Inst. for Aerospace Studies). Sep 1982. 102p. NTIS, PC A06/MF A01.

Laser resonance saturation represents an extremely rapid and efficient new method of coupling laser energy into either a gas or plasma. We have continued to study this process both theoretically and experimentally and have shown that this interaction can lead to a very high degree of ground level burnout for the laser pumped species. During the past year we have undertaken the first time resolved Stark width measurements of the free electron density within a sodium plasma created by laser resonance saturation. Currently we are exploring the feasibility of using this ground level burnout feature as the basis of a new approach towards the development of an efficient short wavelength laser. In a preliminary experiment we have been able to show that sudden joule heating of a thin foil looks promising as a technique for creating the steep gradient of neutral atoms necessary for charge exchange formation of a ground level population inversion within the species having suffered a ground level burnout through laser resonance saturation.

54492 **(AD-A—126611/3) F^2 boundary layer measurement in a chemical laser slit nozzle flow. Technical report.** Spencer, D.J.; Durran, D.A.; Bixler, H.A.; Varwig, R.L. (Aerospace Corp., El Segundo, CA (USA). Aerophysics Lab.). 15 Feb 1983. 27p. (TR—0083(3930-01)-2). NTIS, PC A03/MF A01.

A sensitive F^2 absorption diagnostic suitable for slit nozzle scanning was developed and applied to the measurement of an F^2 boundary layer in an HF chemical laser flow. The F^2 boundary layer profile was determined to be of exponential decay form with peak at the nozzle wall and of width approx. 1/3 the viscous boundary layer. The F^2 concentration profile was displaced inwardly and slightly compressed by the H2 slit injection at the nozzle exit plane, which penetration profile followed the relation delta = 0.1(sq. root of x). The F^2 profile apparently remains fairly intact in passing through the lasing zone.

54493 **(AD-A—126620/4) Bibliography of Soviet laser developments number 57, January-February 1982.** (Defense Intelligence Agency, Washington, DC (USA). Directorate for Scientific and Technical Intelligence). 2 Mar 1983. 162p. (DIA-DST—2700Z-003-83). NTIS, PC A08/MF A01.

This is the Soviet Laser Bibliography for January-February 1982, and is No. 57 in a continuing series on Soviet laser developments. The coverage includes basic research on solid state, liquid, gas, and chemical lasers; components; nonlinear optics; spectroscopy of laser materials; ultrashort pulse generation; crystal grow-

ing; theoretical aspects of advanced lasers, and general laser theory. Laser applications are listed under biological effects; communications; beam propagation; computer technology; holography, laser-induced chemical reactions; measurement of laser parameters; laser measurement applications; laser-excited optical effects; laser spectroscopy; beam-target interaction; and plasma generation and diagnostics.

54494 **(AD-A—127075/0) F-atom depletion in NF^3 combustor laser flows. Technical report.** Durran, D.A.; Spencer, D.J.; Herbelin, J.M.; Kwok, M.A.; Warren, W.R. (Aerospace Corp., El Segundo, CA (USA). Aerophysics Lab.). 15 Feb 1983. 21p. (TR—0083(3930-01)-1). NTIS, PC A02/MF A01.

Chemical lasers employing NF^3 combustors operating at temperatures below 1900 K are subject to F atom depletion because of NFx (x=1,2) radical chemistry. Experiments using arc-heated NF^3-He mixtures have shown that the F atom flow stagnation temperatures of 1000 to 1600 K is significantly reduced while considerable NF chemiluminescence is observed. A method for obtaining F atom flow from low temperature combustors is described.

54495 **(AD-A—127412/5) Characterization of laser beam quality. Master's thesis.** Gumahad, A.T. II. (Air Force Inst. of Tech., Wright-Patterson AFB, OH (USA). School of Engineering). Dec 1982. 107p. NTIS, PC A06/MF A01.

Current methods of characterizing the quality of laser beams were found to be generally insufficient. Since lasers are gaining more use in many applications, an improved set of quality criteria must mow be developed. This thesis report investigated characteristics of random phase aberrations and its effects on the far-field irradiance distribution of lasers. A numerical model was developed to simulate nondiffraction-limited beams.

54496 **(AD-A—127426/5) Recent development of high-power visible laser sources employing solid-state slab lasers and nonlinear harmonic conversion techniques. Technical information series.** Liu, Y.S.; Jones, W.B.; Chernoch, J.P. (General Electric Co., Schenectady, NY (USA)). May 1981. 10p. NTIS, PC A02/MF A01.

Recent developments in high-power solid-state lasers (Nd:YAG, Nd:glass) have greatly improved both average power capability and beam brightness. This has been a result, to a large extent, of the development of the total-internal-reflection slab-type solid-state laser configuration, which provides a self-compensating mechanism to minimize the thermally induced distortion commonly observed in solid-state lasers. Near diffraction-limited, high peak power, high average power solid-state lasers are ideal pump sources for nonlinear frequency conversions using harmonic generation, stimulated Raman scattering and/or pumping dye lasers for ultraviolet (UV), visible, and infrared (IR) coherent light sources. Continuously tunable coherent sources covering a spectral range from 0.2 microns to beyond 3 microns, using these combined techniques, have been reported.

54497 **(AD-A—128280/5) Study of short pulse mercury bromide laser. Final report, 15 March-30 November 1982.** Liu, C.S.; Leslie, S.G.; Liberman, I. (Westinghouse Electric Corp., Pittsburgh, PA (USA). Research and Development Center). 14 Feb 1983. 16p. NTIS, PC A02/MF A01.

This report summarizes research work performed at the Westinghouse RandD Center under ONR Contract No. N00014-82-C-0318 for the period between March 15, 1982 and November 30, 1982. The major effort was to perform experimental studies of the generation of a short laser pulse (< 10 ns) from a cavity dumped HgBr laser. In this report, we will describe a cavity dumped HgBr laser emitting 8 ns (FWHW) laser pulses with output energies of 11.5 mJ/pulse at a cavity dumping efficiency of 58%. Finally, we will discuss the problems related to the cavity dumping of a high energy HgBr laser and possible solutions to these problems.

54498 **(AD-A—128533/7) Research studies on radiative collisional processes. Final report, 1 October 1979-30 September 1982.** Harris, S.E.; Young, J.F. (Stanford Univ., CA (USA). Edward L. Ginzton Lab.). Nov 1982. 47p. (GL—3520). NTIS, PC A03/MF A01.

This program has supported theoretical and experimental studies in several areas of device physics: the physics and applications of radiative collisional lasers, pair absorption pumped lasers, the use of microwave pumping for the excitation of excimer and other high pressure lasers, and the development of anti-Stokes spectroscopy for the study of core-excited atomic levels.

54499 **(AD-A—128534/5) Alkali-rare gas and metal-halide molecules as potential tunable and efficient lasers in the visible. Final report, 1 October 1981-30 September 1982.** Eden, J.G. (Illinois Univ., Urbana (USA). Dept. of Electrical Engineering). Nov 1982. 25p. (UILU-ENG—82-2554). NTIS, PC A02/MF A01.

Experiments involving metal-halide dissociation lasers are described. A UV-preionized, discharge-pumped CdI (cadmium iodide) laser has been demonstrated at 657 nanometers. In addition, iron (Fe) and lithium (Li) photodissociation lasers have been demonstrated.

54500 **(AD-A—128623/6) Review of two-stage FEL research at KMS fusion. Technical report Jan-Sep 82.** Segall, S.B.; Hiddleston, H.R.; Takeda, H.; VonLaven, S.; Holsinger, R. (KMS Fusion, Inc., Ann Arbor, MI (USA)). 21 Jan 1983. 70p. (KMSF-U—1307). NTIS, PC A04/MF A01.

This paper reviews continuing work in support of a two-stage free electron laser (FEL) experiment to be performed at the University of California, Santa Barbara. The quasioptical resonant cavity structure that will be used in this experiment is described and scaling of second stage output with a number of system parameters is given. Absorption, diffraction, and mode conversion losses are calculated for the long wavelength pump field for a simple unoptimized cavity design, and an experimental facility to measure losses in a test cavity is described, a design concept for a permanent magnet helical wiggler to be used in this experiment is presented. Deficiencies of the present accelerator are described and corrective measures are suggested. A conceptual design for an accelerator that could be used with a high power, two-stage FEL is presented. The three-dimensional wave equation for an FEL with either a magnetic of electromagnetic pump field is derived and an incremental solution in cylindrical coordinates is developed. A resonant particle model is used to obtain information on phase shift and gain in two-dimensional cylindrically symmetric systems.

54501 **(AD-A—129004/8) Electron orbits in a free electron laser with a longitudinal magnetic wiggler. Technical report.** Aamodt, R.E. (Science Applications, Inc., Boulder, CO (USA). Plasma Research Inst.). Mar 1983. 18p. (SAI—254-83-416-LJ; PRI—60). NTIS, PC A02/MF A01.

In studies of free electron lasers (FEL) systems, in which emission gain is induced through wiggler magnetic field modulation of the electron motion, detailed knowledge of the electron orbits is necessary in order to evaluate the critical features of the amplification scheme. These features include evaluating the frequency range for amplification, gain, rates, saturation mechanisms, and amplifying efficiencies. However, there exist very few magnetic geometries where the electron motion, even in the vacuum fields, can be obtained analytically with sufficient information to assess these critical features. Only recently has it been realized that in the on axis approximation the helical wiggler orbit problem can be reduced to quadrature, and that particular discovery has already led to significant progress in FEL amplification schemes. For FEL systems with strong magnetic guide fields, little or no insightful progress has been made except for this helical case. However, for just this class of magnetic systems, i.e. strong guide fields with a relatively low amplitude magnetic wiggler superimposed, an asymptotic mathematical formalism does exist where the electron equations of motion in the vacuum fields can be greatly simplified, and typically reduced to quadrature in parameter regimes of relevance to applications.

54502 **(AD-A—129442/0) Free electron laser research in Europe. Technical report.** Neighbours, J.R. (Office of Naval Research (USA). London Branch Office). 3 Mar 1983. 15p. (ONRL-R—3-83). NTIS, PC A02/MF A01.

This report describes the activity in free electron laser research in France, Israel, Italy, and the United Kingdom. In addition, the report lists key scientists and their recent works.

54503 **(AD-A—129467/7) Bibliography of soviet laser developments, number 58, March-April 1982.** (Defense Intelligence Agency, Washington, DC (USA). Directorate for Scientific and Technical Intelligence). May 1983. 146p. (DIA-DST—2700Z-004-83). NTIS, PC A07/MF A01.

This is the Soviet Laser Bibliography for March-April 1982, and is No. 58 in a continuing series on Soviet laser developments. The coverage includes basic research on solid state, liquid, gas, and chemical lasers; components; nonlinear optics; spectroscopy of laser materials; ultrashort pulse generation; crystal growing; theoretical aspects of advanced lasers; and general laser theory. Laser applications are listed under biological effects; communications; beam propagation; computer technology; holography; laser-induced chemical reactions; measurement of laser parameters; laser measurement applications; laser-excited optical effects; laser spectroscopy; beam-target interaction; and plasma generation and diagnostics.

54504 **(AD-A—129478/4) Experimental study of resonance radiation trapping as a method of gain improvement for efficient power extraction from the XeF blue-green laser transition. Final technical report 1 Jan 80-30 Sep 81.** Lin, S. (California Univ., San Diego, La Jolla (USA). Inst. of Pure and Applied Physical Sciences). 30 Sep 1981. 42p. NTIS, PC A03/MF A01.

An experimental study has been carried out to explore the possibility of utilizing resonance radiation trapping as a method of gain improvement for efficient power extraction from the XeF C → A blue-green laser transition. The experiment involved placing low-loss dichromatic mirrors to form a high-Q optical cavity around an x-ray preionized, homogeneous pulsed avalanche/self-sustained discharge of approximately 1 liter volume and approximately 200 nsec duration. The double-peak spectral reflectivity of the dichromatic mirrors was so chosen that most of the uv resonance radiation from the XeF B → X transition associated with the low-order TEM modes of the optical cavity could be trapped while the blue-green laser radiation built up within the same cavity from the C → A inversion could be partially coupled out. No gain improvement has been observed, however, in such an experiment. Instead, gain measurements at several XeF C → A transition wavelengths repeatedly showed large absorption losses during the early and late phases of the discharge, regardless of whether the uv resonance radiation trapping mirrors were used or not. Various factors which may have contributed to these negative results are examined and discussed.

54505 **(AD-A—129527/8) Pulsed chemical laser with variable-pulse-length electron-beam initiation and magnetic confinement. Technical report Nov 79-Apr 80.** Amimoto, S.T.; Whittier, J.S.; Lundquist, M.L.; Ronkowski, F.G.; Hofland, R. (Aerospace Corp., El Segundo, CA (USA). Aerophysics Lab.). 25 Apr 1983. 16p. (TR—0083(3606)-1). NTIS, PC A02/MF A01.

The performance of a pulsed HF (DF) chain laser was investigated for the case of transverse initiation by a magnetically confined electron beam. Laser energy and beam quality are presented as functions of electron-gun, magnetic field, gas mixture, and optical resonator parameters; results include 79 s/liter HF laser output and electrical efficiency for conversion of total incident electron-beam energy to laser output energy of 45%.

54506 **(AD-A—129571/6) Study of a nuclear gamma-ray laser. Interim technical report.** Liboff, R.L.; Heffernan, D.M.; Yaakobi, B. (Cornell Univ., Ithaca, NY (USA)). 3 Jun 1983. 16p. (R—3-83). NTIS, PC A02/MF A01.

In this analysis we describe briefly a possible approach to the realization of a gamma-ray laser ('graser') 1,2. The proposed scheme has its basis in certain long-lived excited states among the heavier nuclei. Decay of such states, for the most part, gives rise to high-order multipole radiation. These excited states are populated through either beta-decay or electron capture. The device presumes that a collection of such long-lived excited states is unstable to induced resonant emission. Decay of parent nuclei serve as the pumping mechanism in the proposed lasing scheme.

54507 **(AD-A—129995/7) Non-linear optical interactions in semiconductors. Final report 1 Apr 79-31 Mar 83.** Salour, M.M. (Massachusetts Inst. of Tech., Cambridge (USA). Research Lab. of Electronics). Apr 1983. 15p. NTIS, PC A02/MF A01.

The first tunable CW laser action in both mode-locked and unmode-locked (in both straight and ring cavity) configurations has been demonstrated. The gain media were platelets of CdS, CdSe, InGaAsP, and HgCdTe. Pulse as short as 2.8 Psec and continous tunability between .5 micrometers and 2.5 micrometers has been achieved. Picosecond spectroscopy of bound excitons, using a synchronously operating streak camera; and picosecond photoelectric emission from a Zirconium metal surface have been studied. The first experimental technique for compensating the pulse broading in single-mode optical fibers using the slow anomalous pulse propagation in the exciton-polariton resonance in a Direct-gap semiconductor has been demonstrated.

54508 **(AD-A—130036/7) Exciton-laser amplifier. Interim technical report.** Liboff, R.L.; Liu, K.C. (Cornell Univ., Ithaca, NY (USA)). 1 Dec 1982. 9p. (R—4-82). NTIS, PC A02/MF A01.

A laser-amplifying device is described which is based on the stimulated decay of excitons in a pure crystal. An estimate is made of the gain of the device. At a typical frequency the gain is found to be appreciably large thus suggesting practical application of the laser amplifier.

54509 **(DOE/DP/40173—T1) Study of $O_2(^1\Delta)$ production by nuclear pumping. Final report submitted to the Air Force Weapons Laboratory.** Miley, G.H. (Illinois Univ., Urbana (USA). Fusion Studies Lab.). 1 Jun 1983. Contract AS08-82DP40173. 99p. NTIS, PC A05/MF A01. Order Number DE83017758.

Studies concerned with the possible use of nuclear pumping to produce $O_2(^1\Delta)$ are described. The goal is to develop methods to produce adequate $O_2(^1\Delta)$ to use in a O_2-I_2 mixing-type laser. Although the $O_2(^1\Delta)$ concentrations generated in the nuclear induced discharge are too small for the operation of an iodine laser, one of the most promising approaches identified involves the initial production of ozone by nuclear pumping of a high pressure ($\sim$ 5 atm) O_2-He mixture. The ozone mixture is then photodecomposed by use of a KrF nuclear pumped flashlamp. Based on a combination of experimental and theoretical data, it is estimated that O_2 ($^1\Delta$)/O_2 ratios > 0.3 can be produced this way with $\sim$ 7 Torr of $O_2(^1\Delta)$ in a mixture initially containing 2 Torr of O_3. This is well above the minimum requirements for operation of an iodine laser. Experimental results of nuclear pumping O_2-noble gas mixtures in a pulsed TRIGA reactor are described and scaling relations developed. While direct pumping results provide interesting kinetics data, the yields obtainable are much lower than through the ozone route. Various unique diagnostics and operation of a nuclear sustained electrical discharge are described. The detailed kinetics model used to analyze these results is also presented.

54510 **(LA-UR—83-2411) Evolution of long pulses in a tapered wiggler free-electron laser.** Goldstein, J.C. (Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. 10p. (CONF-8306121—2). NTIS, PC A02/MF A01. Order Number DE83017235.

From 4. workshop on free-electron laser devices; Eastsound, WA, USA (27 Jun 1983).

Portions are illegible in microfiche products.

The evolution of a long pulse (pulse length much greater than the slippage distance) in a tapered wiggler free-electron laser is studied by numerical solution of the 1-D theoretical model for a realistic set of magnet, electron beam, and optical resonator parameter values. Single-pass gain curves are calculated for low and high light intensity. We find that an initial, low-amplitude, incoherent pulse grows into a coherent pulse whose growth rate agrees with the calculated small signal gain. The transient evolution of coherent pulses is calculated for several different cavity length detunings, and a quasi steady-state desychronism curve is given. The frequency changing behavior of the optical pulse is shown to occur through sideband generation associated with synchrotron oscilla-

tions. Pulse evolution with an ideal intracavity high-pass optical filter is calculated.

54511 **(LA-UR—83-2443) Los Alamos free-electron-laser oscillator experiment: plans and present status.** Warren, R.W.; Fraser, J.S.; Stein, W.E.; Winston, J.G.; Swann, T.A.; Lumpkin, A.; Sheffield, R.L.; Sollid, J.E.; Newnam, B.E.; Brau, C.A. (Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. 8p. (CONF-8306121—3). NTIS, PC A02/MF A01. Order Number DE83017290.

From 4. workshop on free-electron laser devices; Eastsound, WA, USA (27 Jun 1983).

Plans have been made to modify the Los Alamos free-electron-laser amplifier experiment to allow its use as an oscillator at 10.6 microns. Several major changes were required, all of which have now been completed. The necessity for these changes is discussed as are the details of their fulfillment. In some cases we have progressed to the point where we can report on the performance of the new systems. The present status is described.

54512 **Three-dimensional propagation in free-electron laser amplifiers.** Coffey, B.J.; Elliott, C.J.; Lax, M. (Dept. of Physics, City College of New York, New York, NY 10031). *IEEE (Institute of Electrical and Electronics Engineers) Journal of Quantum Electronics;* **19**: No. 3, 297-305(Mar 1983).

The authors describe a numerical approach to three-dimensional simulation of free-electron lasers. They argue that neglecting the radial dependence of the wiggler vector potential is a good first approximation for the laser under study. They study the optical field in the paraxial approximation and ignore the electron-electron interaction. The optical field is propagated using a new implementation of well-known Fourier-Bessel techniques. Some preliminary amplifier results are presented.

54513 **Results of the Los Alamos free-electron laser experiment.** Warren, R.W.; Brau, C.A.; Newnam, B.E.; Stein, W.E.; Winston, J.G.; Young, L.M. (Los Alamos National Lab, Los Alamos, NM 87545). *IEEE (Institute of Electrical and Electronics Engineers) Journal of Quantum Electronics;* **19**: No. 3, 391-400(Mar 1983).

A free-electron laser (FEL) amplifier experiment to test the performance of a tapered wiggler at high optical power has been successfully completed. A well-separated two-component electron energy distribution has been obtained that is characteristic of a tapered wiggler. Energy distribution spectra and extraction efficiencies have been measured as a function of initial electron energy, energy spread, emittance, optical power, and spatial and temporal misalignments of the laser and electron beams. A maximum efficiency of approximately 4 percent was measured, and good agreement of efficiency with a one-dimensional theory was obtained.

54514 **Optical distortion due to gas- dynamic motion in a photolytically pumped cylindrical laser cavity.** Riley, M.E.; Rice, J.K. (Sandia National Laboratories, Albuquerque, NM 87185). *IEEE (Institute of Electrical and Electronics Engineers) Journal of Quantum Electronics;* **19**: No. 3, 401-409(Mar 1983). Contract AC04-76DP00789.

The authors give a general solution for the growth of refractive disturbances caused by gas-dynamic motion accompanying diffuse photolytic pumping of a cylindrically symmetric laser medium. Results are derived in sufficient generality to reveal scaling with all important system parameters except bleaching of the pump transition. A simple bounding relation is derived which ensures the preservation of neardiffraction-limited laser beam quality. The results apply to any cylindrical gas laser pumped by an external diffusely illuminating light source. The amount of optical disturbance is characterized by the pump-band optical depth or extinction and the thermal energy release per pump-band absorption event. Specific details are given for the photodissociation atomic iodine laser; the usefulness of buffer gases to increase the heat capacity of the active medium is quantified.

54515 **Laser cutting nozzle.** Ramos, T.J. US Patent Application 6-429,921. 30 Sep 1982. 11p. Contract W-7405-ENG-48.

A laser cutting nozzle for use with a laser cutting apparatus directing a focused beam to a spot on a work piece. The nozzle has a cylindrical body with a conical tip which together have a conically shaped hollow interior with the apex at a small aperture through the tip. The conical hollow interior is shaped to match the profile of the laser beam, at full beamwidth, which passes through the nozzle to the work piece. A plurality of gas inlet holes extend through the body to the hollow interior and are oriented to produce a swirling flow of gas coaxially through the nozzle and out the aperture, aligned with the laser beam, to the work piece.

54516 **Inductive gas line for pulsed lasers.** Benett, W.J.; Alger, T.W. US Patent Application 6-426,435. 29 Sep 1982. 15p. Contract W-7405-ENG-48.

A gas laser having a metal inlet gas feed line assembly shaped as a coil, to function as an electrical inductance and therefore high impedance to pulses of electric current applied to electrodes at opposite ends of a discharge tube of a laser, for example. This eliminates a discharge path for the laser through the inlet gas feed line. A ferrite core extends through the coil to increase the inductance of the coil and provide better electric isolation. By elimination of any discharge breakdown through the gas supply, efficiency is increased and a significantly longer operating lifetime of the laser is provided.

4204 Heat Transfer And Fluid Flow

REFER ALSO TO CITATION(S) 53816, 53853, 53926, 54075, 54364, 55122

54517 **(AD-A—129856/1) Computer program for performance and sizing analysis of compact counter-flow plate-fin heat exchangers. Research and development report.** Ness, J.C. (Naval Ship Research and Development Center, Annapolis, MD (USA)). Dec 1982. 63p. (DTNSRDC/PAS—82-41). NTIS, PC A04/MF A01.

This report presents a computer program for preliminary design analysis of counter-flow, compact, plate-fin heat exchangers. The program method is based on the effectiveness-NTU relationship analysis. The heat exchanger design begins with assumptions for counter-flow length, total frontal flow area and core matrix fin geometry. Using these constraints, the program proceeds to calculate the resulting effectiveness and pressure drop based on specified air-side and gas-side conditions. Input design requirements include selected air-side and gas-side fin types; the pressures, temperatures, and mass flows of the air and gas streams; fuel-air ratio; as well as, the maximum air-side inlet header velocity. Heat exchanger designs may be generated based on four different fin types (i.e., plain, louvered, strip/offset or wavy fins) over a varied number of core dimensions. Program output includes inlet and exit conditions on air and gas sides, effectiveness, fin characteristics, core length and volume, total frontal flow area, pressure drops, overall enclosure height, number of transfer units, overall weight, and air-side header diameters and velocities. This report presents the analysis method, description of input and output with sample cases, and a program listing.

54518 (CONF-830528—Summ., pp D.III.3-D.III.4) **Heat transfers: calculation of temperatures using a HP 41 CV microcomputer.** Roy, J.C.; Fradin, J. (COGEMA, Velizy, France). 1983. NTIS, PC A21/MF A01.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

54519 **(CONF-800616—) Proceedings of the 1980 Heat Transfer and Fluid Mechanics Institute.** Gerstein, M.; Choudhury, P.R. (eds.). (Stanford Univ., CA (USA)). 1980. Contract AT03-80ER10573. 261p. NTIS, PC A12/MF A01. Order Number DE83012805.

From Heat Transfer and Fluid Mechanics Institute conference; Los Angeles, CA, USA (23 Jun 1980).

Portions are illegible in microfiche products.

The volume contains 16 papers presented at the meeting. Those in scope for the Energy Data Base are indexed separately. The papers are grouped under general topics that include problems in heat transfer and fluid mechanics, flow and heat transfer with chemical reaction, numerical and analytical methods in fluid me-

chanics and heat transfer. Specific subjects covered include convective and radiative heat transfer under various conditions and geometries, centrifugal fans, mass transfer in turbulent pipe flow with chemical reaction, liquid phase decomposition of fuels, laminar-jet diffusion flames, internal heat transfer of a porous medium, and others.

54520 (CONF-8006216—, pp 1-20) **Laminar natural convection along vertical corners.** Ramakrishna, K. (Polytechnic Inst. of New York, Brooklyn); Khosla, P.K.; Rubin, S.G. 1980. NTIS, PC A12/MF A01.

From Heat Transfer and Fluid Mechanics Institute conference; Los Angeles, CA, USA (23 Jun 1980).

Laminar natural convection of air along a vertical 90 degree corner has been analyzed. Both similarity and non-similarity solutions of isothermal, constant heat flux and variable temperature walls are obtained numerically. A strongly implicit procedure is used for these calculations. The results compare reasonably with the experimental data; moreover, the non-similar solutions exhibit better agreement in the leading edge region.

54521 (CONF-8006216—, pp 21-37) **Convective heat transfer with a periodic longitudinal heat flux variation.** Clements, L.D.; Lee, Y.F. (Texas Tech Univ., Lubbock). 1980. NTIS, PC A12/MF A01.

From Heat Transfer and Fluid Mechanics Institute conference; Los Angeles, CA, USA (23 Jun 1980).

A large proportion of the research in convective heat transfer has centered on boundary conditions of a fixed wall temperature or fixed wall heat flux. In this experimental study the influence of a longitudinally periodic (square wave) heat flux profile on forced convection heat transfer in the single phase liquid, sub-cooled boiling, and low quality two-phase flow boiling regimes is of interest. These experiments appear to be one of the first attempts to describe behavior under a periodically varying heat flux for sub-cooled or developing flow-boiling. The experiments described in this paper were conducted using water at low pressure in a joule-heated test section. The test section was machined to have an exterior wall whose thickness varied in a step-wise fashion. When direct current is passed through the walls of the tube, the variation in wall cross-sectional area is sufficient to vary the resistance-generated wall heat flux. Primary experimental data are the wall temperature and derived heat flux profile and the pressure drop across the test section. Local heat transfer coefficients along the tube are calculated and compared with predictions based on constant heat flux boundary conditions. It is of significance that the local heat transfer coefficients in single phase forced convection and in sub-cooled boiling do not appear to be particularly affected by the periodically varying heat flux boundary condition. However, at moderately high heat fluxes, the flow boiling behavior is profoundly affected. The local heat transfer coefficients follow the wall heat flux behavior rather closely. The overall average forced convection boiling heat transfer coefficient under conditions of varying wall heat flux was found to be about half of what was predicted for flow boiling under constant wall flux conditions.

54522 (LBL—15751) **Heat transfer to subcooled He I.** Caspi, S. (Lawrence Berkeley Lab., CA (USA)). Jul 1983. Contract AC03-76SF00098. 10p. (CONF-830841—19). NTIS, PC A02/MF A01. Order Number DE83017767.

From Cryogenic engineering conference and international cryogenic materials conference; Colorado Springs, CO, USA (15 Aug 1983).

Portions are illegible in microfiche products.

To study heat transfer into subcooled He I, a copper block with an embedded heater was used. The block's temperature was measured and the characteristic boiling curves were recorded. The measurement accuracy of heater power and block temperature was sufficient to record the convection region prior to nucleate boiling. The effective size of the pool in the apparatus could be restricted by introducing an adiabatic wall parallel to and a fixed distance from the heated surface. Free convection heat transfer, limiting heat flux to subcooled He I, and geometry effects are reported. (LEW)

54523 (PNL-SA—9530-Pt.2) **Experimental results and operational characteristics of heat exchangers in dry/wet operations.** Hauser, S.G.; Kreid, D.K.; Johnson, B.M. (Pacific Northwest Lab., Richland, WA (USA)). Aug 1982. Contract AC06-76RL01830. 28p. (CONF-830301—19-Pt.2). NTIS, PC A03/MF A01. Order Number DE83008518.

From ASME-JSME thermal engineering joint conference; Honolulu, HI, USA (20 Mar 1983).

This second part of a two-part paper summarizes the experimental evaluation of three air-cooled finned heat exchangers, both with and without the finned surface, wetted by flowing water. In addition, the performance of one of the heat exchangers is compared with predictions from the model which was presented in Part 1. The experimental results are in close agreement with the predictions based on the model. Once the effective film coefficient of the deluge film was determined, deluge performance was predicted using dry heat transfer correlations.

54524 (SAND—83-1844C) **Construction and verification of a finite-element method for nonisothermal flows in porous media.** Gartling, D.K.; Reda, D.C. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 15p. (CONF-8309135—2). NTIS, PC A02/MF A01. Order Number DE83017158.

From Computational engineering mechanics conference; Dalian, China (4 Sep 1983).

A Galerkin-based, finite element method is developed for numerically simulating nonisothermal flows in porous materials. The partial differential equations describing heat and mass transfer in a rigid porous matrix are described. Use of the finite element method to produce a computational procedure is outlined and solution procedures for the finite element equations are discussed. An experiment involving mixed free and forced convection is used to verify the accuracy of the numerical procedure.

54525 (UCID—19887) **FACET: a radiation view factor computer code for axisymmetric, 2D planar, and 3D geometries with shadowing.** Shapiro, A.B. (Lawrence Livermore National Lab., CA (USA)). Aug 1983. Contract W-7405-ENG-48. 35p. NTIS, PC A03/MF A01. Order Number DE84000359.

The computer code FACET calculates the radiation geometric view factor (alternatively called shape factor, angle factor, or configuration factor) between surfaces for axisymmetric, two-dimensional planar and three-dimensional geometries with interposed third surface obstructions. FACET was developed to calculate view factors for input to finite-element heat-transfer analysis codes. The first section of this report is a brief review of previous radiation-view-factor computer codes. The second section presents the defining integral equation for the geometric view factor between two surfaces and the assumptions made in its derivation. Also in this section are the numerical algorithms used to integrate this equation for the various geometries. The third section presents the algorithms used to detect self-shadowing and third-surface shadowing between the two surfaces for which a view factor is being calculated. The fourth section provides a user's input guide followed by several example problems.

54526 **Measurements of the rise velocities of bubbles, slugs and pressure waves in a gas-solid fluidized bed using pressure fluctuation signals.** Fan, L.T.; Ho, T.; Walawender, W.P. (Department of Chemical Engineering, Kansas State University, Manhattan, KS 66506). *AIChE (American Institute of Chemical Engineers) Journal;* 29: No. 1, 33-39(Jan 1983). Contract AC21-81MC16310.

The rise velocities of bubbles, slugs and pressure waves in a fluidized bed have been measured on-line through the use of pressure transducers coupled with the cross-correlation technique. Sand and glass beads with different particle sizes were tested. Effects of the gas flow rate and column diameter on the rise velocities of bubbles and slugs were investigated. The results were correlated with two models developed in this work and were compared with the data obtained by other investigators.

54527 **Behavior of particles in a liquid-solid fluidized bed.** Yutani, N.; Fan, L.T.; Too, J.R. (Department of Chemical Engineering, Kansas State University, Manhattan, KS 66506). *AIChE (American Institute of Chemical Engineers) Journal;* **29**: No. 1, 101-106(Jan 1983). Contract AC21-81MC16310.

The mechanics of particle motion in a fluidized bed were studied by focusing on the microscopic behavior of the particles. The local displacements of nylon particles fluidized by liquid were measured by the micro-capacitance method, and the resultant time series was analyzed by determining its auto-correlation function and the corresponding power spectrum. This has given rise to a stochastic or statistical model of particle displacements in the fluidized bed. This model visualizes the particle motion in a fluidized bed to consist of the random movement, generating irregular signals, and the linear movement, generating wave-like signals.

54528 **Using diffusion measurements to determine pore-size distributions in porous materials.** Brown, L.F.; Travis, B.J. (Los Alamos National Lab., NM). *Chemical Engineering Science;* **38**: No. 6, 843-847(1983).

A method for determining a type of pore-size distribution from diffusion measurements is presented. A Wicke-Kallenbach experiment, for measuring diffusion fluxes within porous materials, is carried out over a significant portion of the transition range between Knudsen flow and bulk diffusion. If the internal porous structure of the material is modeled as myriad nonintersecting cylindrical pores, an equation may be derived for the flux as a function of pressure, in which the flux is a functional of the pore-size distribution. The equation is a Fredholm integral equation of the first kind. This is an application of the general inversion problem, and solution of the equation for the pore-size distribution is possible. It is demonstrated from calculated fluxes using postulated ideal distributions that the method works very well for both unimodal and bimodal distributions. The method is not extraordinarily sensitive to experimental error. The pore-size distribution obtained using this method embodies not only the sizes of the pores, but includes other properties affecting diffusion rates, such as pore shapes, directions, and interconnectivities. 2 figures.

54529 **(LA-tr—83-14) Equations governing the liquid-film flow over a plane with heat flux and interfacial phase change.** Spindler, B. (Los Alamos National Lab., NM (USA); CEA Centre d'Etudes Nucleaires de Grenoble, 38 (France)). 1983. Contract W-7405-ENG-36. Translation of CEA-R-5061. 158p. NTIS, PC A08/MF A01. Order Number DE83017528.

Portions are illegible in microfiche products.

The purpose of the study is to find a system of equations which can be used to study the linear stability of a liquid film flow over a plane exhibiting wall heat flux and interfacial phase change. The flow of such a film is governed by four groups of equations: the equations for mass balance, momentum and energy in the liquid; equations for the balance in the steam; equations for the balance at the liquid-steam interface; and the boundary conditions. Two flow patterns are considered - flow with upstream film and film condensation. Stability is studied by perturbation methods. (LEW)

54530 **Method for braze-joining spirally wound tapes to inner walls of heat exchanger tubes.** Garrison, M.E. US Patent Application 6-414,545. 3 Sep 1982. 10p. Contract W-7405-ENG-26.

The present invention is directed to a method of fabricating heat exchanger tubes in which twisted tapes are utilized for promoting turbulence and heat transfer. The method of the present invention provides for the brazing of the tapes to the inner walls of the tubes for enhancing heat transfer between the fluid within the conduit and a fluid medium outside of the conduit by conduction through the tape. The braze joint of the present invention is coextensive with the tape over the entire length thereof within the conduit. The practice of the present invention is achieved by placing a filler wire of brazing metal along the tape at a location removed from the side walls and then heating the conduit and tape sufficiently to effect the displacement of the filler metal by wicking to the contact point between the tape and the conduit wall to form a braze joint coextensive with the length of the tape within the conduit. This arrangement provides maximum heat transfer and assures that the tape is in contact with the conduit over the entire common length thereof.

4205 Materials Testing

REFER ALSO TO CITATION(S) 54204, 54242, 54775

54531 **(IS-M—433) Elastic-wave inverse scattering in non-destructive evaluation.** Rose, J.H. (Ames Lab., IA (USA)). 1983. Contract W-7405-ENG-82. 16p. NTIS, PC A02/MF A01. Order Number DE83017683.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Ultrasonic detection and characterization of flaws in metals and ceramics is of considerable technological interest. Scattering and inverse scattering theories have recently been applied to these tasks in a systematic manner and considerable progress has resulted. This paper first reviews briefly the development of scattering and inverse scattering methods in the AF/DARPA Program in Quantitative Non-Destructive Evaluation. Then one particular inverse method, the inverse Born approximation, is discussed in detail. Progress is reviewed and the ability of the method to distinguish volumetric and crack-like flaws is demonstrated in simple cases.

54532 **(IS-M—440) Inverse Born Approximation: exact determination of shape of convex voids.** Rose, J.H.; Opsal, J.L. (Ames Lab., IA (USA); Lawrence Livermore National Lab., CA (USA)). 1983. Contract W-7405-ENG-82. 11p. (CONF-830811—5). NTIS, PC A02/MF A01. Order Number DE83017685.

From Conference on quantitative NDE; Santa Cruz, CA, USA (7 Aug 1983).

The Inverse Born Approximation (IBA) to the elastic wave inverse scattering problem is known to give highly accurate results for the shape of complex voids. This paper presents an argument demonstrating that the IBA is, in fact, exact for determining the size, shape and orientation of a wide class of these scatterers given infinite bandwidth and unlimited aperture information. Essentially, the argument demonstrates how the IBA algorithm picks out the singular contribution to the impulse response function and correctly relates it to the shape of the scatterer. Some specific examples are used to illustrate the more intuitive aspects of the discussion.

54533 **(IS-M—444) Ultrasonic 3-D reconstruction of inclusions in solids using the inverse Born algorithm.** Hsu, D.K.; Rose, J.H.; Thompson, D.O. (Ames Lab., IA (USA)). 1983. Contract W-7405-ENG-82. 24p. (CONF-830811—8). NTIS, PC A02/MF A01. Order Number DE83018082.

From Conference on quantitative NDE; Santa Cruz, CA, USA (7 Aug 1983).

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

An extensive study of the determination of geometric parameters (size, shape, and orientation) of included flaws using the one-dimensional inverse Born approximation. Investigation of the degradation of the 1-D Born inversion algorithm due to resonances and scattering showed that the degradation was not serious provided adequate frequency bandwidth was available. For inclusions in realistic structural materials, one would probably not expect high degrees of geometric symmetry in flaw shape and vast mismatch of impedance between the flaw and host material, strong and sharp characteristic resonances are therefore considered less likely. In the course of developing a reconstruction scheme in terms of an equivalent ellipsoid, the general case of an arbitrarily oriented ellipsoidal flaw was considered and the tangent plane distance, the tangent point distance and the transformation between them analyzed. The method developed was performed quite well in determining the size, shape, and orientation of ellipsoid-like flaws. The reconstruction technique was demonstrated for an inclusion in the bulk, for a void in metal and for an inclusion near a fluid-solid interface.

54534 **(IS-M—445) Progress on ultrasonic flaw sizing in turbine-engine rotor components: bore and web geometries.** Rose, J.H.; Gray, T.A.; Thompson, R.B.; Opsal, J.L. (Ames Lab., IA (USA); Lawrence Livermore National Lab., CA (USA)). 1983. Contract W-7405-ENG-82. 31p. (CONF-830811—9). NTIS, PC A03/MF A01. Order Number DE83018081.

From Conference on quantitative NDE; Santa Cruz, CA, USA (7 Aug 1983).

The application of generic flaw-sizing techniques to specific components generally involves difficulties associated with geometrical complexity and simplifications arising from a knowledge of the expected flaw distribution. This paper is concerned with the case of ultrasonic flaw sizing in turbine-engine rotor components. The sizing of flat penny-shaped cracks in the web geometry discussed and new crack-sizing algorithms based on the Born and Kirchhoff approximations are introduced. Additionally, we propose a simple method for finding the size of a flat, penny-shaped crack given only the magnitude of the scattering amplitude. The bore geometry is discussed with primary emphasis on the cylindrical focusing of the incident beam. Important questions which are addressed include the effects of diffraction and the position of the flaw with respect to the focal line. The appropriate deconvolution procedures to account for these effects are introduced. Generic features of the theory are compared with experiment. Finally, the effects of focused transducers on the Born inversion algorithm are discussed.

54535 **(IS-M—446) Analytic diffraction corrections to ultrasonic scattering measurements.** Thompson, R.B.; Gray, T.A. (Ames Lab., IA (USA)). 1983. Contract W-7405-ENG-82. 20p. (CONF-830811—10). NTIS, PC A02/MF A01. Order Number DE83018080.

From Conference on quantitative NDE; Santa Cruz, CA, USA (7 Aug 1983).

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Ultrasonic theories generally predict a scattering amplitude which relates a spherically spreading, far-field scattered wave to an incident plane wave. In ultrasonic immersion measurements, the frequency and angular dependences of the scattering amplitude are convolved with those of the transmitting and receiving transducers and the propagation through the liquid-solid and solid-liquid interfaces. This paper presents a set of approximate corrections for these effects for the cases of angle beam inspection through planar, spherically curved or cylindrically curved surfaces. The primary parameters in the correction are the function D, which corrects for the diffraction effects occurring during a transducer calibration experiment, and the function C, which describes the on-axis pressure variation of the beam. Values of C and D are available in the literature for the case of a piston transducer radiating into an infinite fluid medium. The major portion of this paper is concerned with the extension of those results to the aforementioned two media problems in which mode conversion, refraction, diffraction, and focussing all play interrelated roles. Results of preliminary experiments to test the corrections are also included.

54536 **(IS-M—449) Elastic-wave scattering from multiple voids (porosity).** Thompson, D.O.; Wormley, S.J.; Rose, J.H.; Thompson, R.B. (Ames Lab., IA (USA)). 1983. Contract W-7405-ENG-82. 16p. (CONF-830811—11). NTIS, PC AMF/A01 02. Order Number DE83018076.

From Conference on quantitative NDE; Santa Cruz, CA, USA (7 Aug 1983).

The ultrasonic technique that has been developed and described in this paper provides a covenient way to determine certain characteristics of a distribution of voids (porosity) in materials. Since the technique is one-sided, i.e., it does not depend upon the reflection of back-surface echoes in order to obtain the results, it would appear to have potential practical value in difficult inspection geometries. Because a model material has been used for this work which shows no ultrasonic scattering due to grain boundaries, the applicability of the technique to other materials is as yet untested. Presumably, such effects can be accounted for so long as the grain size is reasonably uniform. It is expected that less concentrated void distributions can be characterized by this method. The upper limit of validity is determined by the void density at which multiple scattering events must be taken into account. This is a considerably more difficult problem which has yet to be solved.

54537 **(IS-M—456) Effects of crack closure on ultrasonic transmission.** Thompson, R.B.; Skillings, B.J.; Zachary, L.W.; Schmerr, L.W.; Buck, O. (Ames Lab., IA (USA)). 1983. Contract W-7405-ENG-82. 17p. (CONF-830811—7). NTIS, PC A02/MF A01. Order Number DE83018073.

From Conference on quantitative NDE; Santa Cruz, CA, USA (7 Aug 1983).

Ultrasonic waves are attenuated as they propagate past the tip of a crack due to the reflection of the energy at the crack face and diffraction at the crack tip. Crack closure modifies the situation since partial transmission can occur at points along the crack face where asperities come in contact. This phenomenon is important in defining the ability to nondestructively detect closed cracks and in developing a more detailed understanding of the closure phenomenon itself. Modified compact tension specimens were used to investigate the effects of partial crack closure on focussed, through-transmission ultrasonic signals. Data obtained from fatigue cracks in 7075-T651 Al provides evidence for a gradual transition from a fully closed crack condition at the crack tip to an essentially fully open condition at a distance of a few mm from the tip, with additional localized contact along the length of the crack. This interpretation of the data was aided by a two-dimensional, quasi-static model for ultrasonic interaction with a partially contacting interface. The model relates width and separation of asperity contacts to the frequency dependence of the ultrasonic reflection and transmission. These measurements were supplemented by tests in which water infiltrated into the crack opening. The frequency spectra of the ultrasonic transmitted signals for this case were used to estimate the average COD at various points along the crack length.

54538 **(LA-UR—83-2399) High-speed videography combined with an x-ray image intensifier for dynamic radiography.** Bryant, L.E. Jr. (Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. 5p. (CONF-830874—21). NTIS, PC A02/MF A01. Order Number DE83017233.

From 27. annual international technical symposium on high speed photography, videography and photonics; San Diego, CA, USA (21 Aug 1983).

The Spin Physics SP-2000 high-speed video system can be combined with an x-ray source, a dynamic event having internal (not directly visible) movement and an x-ray image intensifier to perform dynamic radiography. The cesium iodide input fluor and P-20 output fluor of the image intensifier have rapid decay to allow x-ray imaging up to 12,000 pictures per second. Applications of this technique include internal functioning of a compressor, turbulent-water action, and other mechanical actions.

54539 **(LA-UR—83-2400) Survey of flash x-ray techniques and applications.** Bryant, L.E. Jr.; Lucero, J.P. (Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. 7p. (CONF-830874—20). NTIS, PC A02/MF A01. Order Number DE83017234.

From 27. annual international technical symposium on high speed photography, videography and photonics; San Diego, CA, USA (21 Aug 1983).

Flash x-ray diagnostics of high-speed dynamic tests need to be reliable as the test may be quite expensive and time-consuming. Preparation for a first-time test can involve many partial or preliminary tests to verify adequacy of x-ray energy, x-ray exposure, film/screen combination, film-holder protection, flash x-ray-generator protection, triggering, and timing techniques. Once these preparations have been successfully completed, very informative results are attainable for a variety of tests including jetting, welding, and casting.

54540 **(MTB—149) Studies on analytical method and nondestructive measuring method on the sensitization of austenitic stainless steels.** Onimura, K.; Arioka, K.; Horai, M.; Noguchi, S. (Mitsubishi Heavy Industries Ltd., Tokyo (Japan)). Mar 1982. 12p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703009.

Austenitic stainless steels are widely used as structural materials for the machine and equipment of various kinds of plants, such as thermal power, nuclear power, and chemical plants. The machines and equipment using this kind of material, however, have the possibility of suffering corrosion damage while in service, and these damages are considered to be largely due to the sensitization of the material in sometimes. So, it is necessary to develop an analytical method for grasping the sensitization of the material more in detail and a quantitative nondestructive measuring method which is applicable to various kinds of structures in order to prevent corrosion damage. From the above viewpoint, studies have been made on the analytical method based on the theory of diffusion of chromium in austenitic stainless steels and on Electro-Potentiokinetics Reactivation Method (EPR Method) as a nondestructive measuring method, using 304 and 316 austenitic stainless steels having different carbon contents in base metals. This paper introduces the results of EPR test on the sensitization of austenitic stainless steels and the correlation between analytical and experimental results.

54541 **(MTB—152) Ultrasonic testing of austenitic stainless steel welds.** Nishino, S.; Hida, Y.; Yamamoto, M.; Ando, T.; Shirai, T. (Mitsubishi Heavy Industries Ltd., Tokyo (Japan)). May 1982. 9p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703010.

Ultrasonic testing of austenitic stainless steel welds has been considered difficult because of the high noise level and remarkable attenuation of ultrasonic waves. To improve flaw detectability in this kind of steel, various inspection techniques have been studied. A series of tests indicated: (1) The longitudinal angle beam transducers newly developed during this study can detect 4.8 mm dia. side drilled holes in dissimilar metal welds (refraction angle: 55° from SUS side, 45° from CS side) and in cast stainless steel welds (refraction angle: 45°, inspection frequency: 1 MHz). (2) Cracks more than 5% t in depth in the heat affected zones of fine-grain stainless steel pipe welds can be detected by the 45° shear wave angle beam method (inspection frequency: 2 MHz). (3) The pattern recognition method using frequency analysis technology was presumed useful for discriminating crack signals from spurious echoes.

54542 **(NIIAR—59(512)) Mathematical model for long-term and current planning of materials research and development with restrictions on the experimental equipment lifetime.** Sherin, V.A. (Nauchno-Issledovatel'skij Inst. Atomnykh Reaktorov, Dimitrovgrad (USSR)). 1981. 18p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703102.

Economic statement of the problem on long-term and current planning of materials research and development is under consideration. The proper mathematical model with restrictions on the experimental equipment lifetime is given. The algorithm for the problem solution is presented. The proposed model reflects the most important conditions for forming long-term and current plans of materials research and development studies. The specific feature of the model is the presence in it of conditions of subjects selection and distribution of volume of works by the planning period stages. The model permits to combine both the stages of volume and volume-calendar planning of materials research and development and use the possibilities of variation with the terms of performing works using experimental equipment for search of the optimum version of the plan.

54543 **Tunable damper for an acoustic wave guide.** Rogers, S.C. US Patent Application 6-435,797. 21 Oct 1982. 14p. Contract W-7405-ENG-26.

A damper for tunably damping acoustic waves in an ultrasonic waveguide is provided which may be used in a hostile environment such as a nuclear reactor. The area of the waveguide, which may be a selected size metal rod in which acoustic waves are to be damped, is wrapped, or surrounded, by a mass of stainless steel wool. The wool wrapped portion is then sandwiched between tuning plates, which may also be stainless steel, by means of clamping screws which may be adjusted to change the clamping force of the sandwiched assembly along the waveguide section. The plates are preformed along their length in a sinusoidally bent pattern with a period approximately equal to the acoustic wavelength which is to be damped. The bent pattern of the opposing plates are in phase along their length relative to their sinusoidal patterns so that as the clamping screws are tightened a bending stress is applied to the waveguide at 180° intervals along the damping section to oppose the acoustic wave motions in the waveguide and provide good coupling of the wool to the guide. The damper is tuned by selectively tightening the clamping screws while monitoring the amplitude of the acoustic waves launched in the waveguide. It may be selectively tuned to damp particular acoustic wave modes (torsional or extensional, for example) and/or frequencies while allowing others to pass unattenuated.

54544 **Micrographic detection of plastic deformation in nickel-base alloys.** Steeves, A.F.; Bibb, A.E. US Patent Application 6-426,448. 20 Sep 1980. 10p. Contract AC12-76SN00052.

A method for detecting low levels of plastic deformation in metal articles comprising electrolytically etching a flow free surface of the metal article with nital at a current density of less than about 0.1 amp/cm² and microscopically examining the etched surface to determine the presence of alternating striations. The presence of striations indicates plastic deformation in the article.

54545 **(ANL-Trans—1204) Eddy-current-inspection method for ferromagnetic transfer tubes: first report.** Hosokawa, T.; Abe, N.; Ohashi, K.; Takahashi, M.; Uematsu, Y. Translated from *Ishikawajima-Harima Giho ;* No. 18, 38-41(1978). Contract W-31-109-ENG-38. 16p. NTIS, PC A02/MF A01. Order Number DE82021364.

Portions are illegible in microfiche products.

The eddy-current-inspection method is commonly used for the inspection of heat-transfer tubes of the heat exchanger. In-service inspection, however, has been limited to the testing of nonferromagnetic tubes due to the predominant influence of high magnetic permeability of ferromagnetic material and its associated noise. The high magnetic permeability of ferromagnetic material and its associated noise. The high magnetic permeability of ferromagnetic material generally results in extremely reduced penetration of eddy current into test materials, so that it is difficult to detect the flaws lying deep under the test surface of the material. In addition, magnetic noise disturbs the detecting of flaw indications. To eliminate such influences, trial inspections employing extremely low test frequencies and the magnetic saturation technique have heretofore been attempted. Presented in this paper is the authors' report, which in effect states that the flaws in the tubes are detectable without using the magnetic saturation technique or extremely low test frequency when the eddy current inspection method is applied to ferromagnetic tubes (2 1/4 Cr-1 Mo steel, 3.2 mm thick) using inside diameter coils.

4207 Vacuum Engineering

REFER ALSO TO CITATION(S) 54620, 54640

54546 (KEK—80-15, pp 17-21) **Manufacture of super-high vacuum testing tank.** Sakai, K.; Suzui, K.; Horigome, T. (Okazaki National Research Inst., Aichi (Japan). Inst. for Molecular Science). Feb 1981. (In Japanese). NTIS (US Sales Only), PC A03/MF A01. (CONF-8010331—).

From 3. symposium on machine work of scientific instruments; Oho, Japan (24 Oct 1980).

This apparatus is one of the preliminary experiment equipments for the vacuum system of a UVSOR, and the main objective is to obtain the clean vacuum below 10^{-10} Torr. From the viewpoint of manufacture, there is no problem, but all the works from the design through manufacture, assembling and adjustment of the apparatus, to the obtaining of required vacuum were carried out by the authors themselves. The design and its points, and manufacture are described. In order to obtain clean vacuum and maintain it for long period, the surface cleaning of vacuum tanks is very important. Therefore the method of electrolytic polishing was adopted for the purpose, and its effectiveness was examined. After the surface treatment by two methods, the evacuation test was carried out, and the attained pressure was compared. Electrolytic polishing seemed to be effective. As the method of suppressing surface degasification, there is argon bombardment method. It was attempted to

improve the pressure attained by baking only further by this method. By baking at 250 deg C for 30 hr only, the final pressure attained was 1.7 x 10^{-10} Torr, and by making argon bombardment twice during baking, it was 0.9 x 10^{-10} Torr, thus slight improvement was obtained. The main objective to obtain vacuum below 10^{-10} Torr was accomplished, but surface treatment requires more experience.

54547 (KEK—81-2, pp 1-7) **New small gauge for ultra high vacuum.** Watanabe, F. (Sakuranoseibo High School, Fukushima (Japan)). Apr 1981. (In Japanese). NTIS (US Sales Only), PC A07/MF A01. (CONF-800194—).

From 3. meeting on ultra high vacuum techniques for accelerators and storage rings; Oho, Ibaraki, Japan (24 Jan 1980).

Recently, for large accelerators and storage rings, ultra high vacuum of about 10^{-11} Torr, and 10^{-12} Torr for specific cases have been required. In the vacuum measurement for these accelerators, it is estimated that the maintenance of its accuracy is very difficult because of (1) causing error by the incidence of secondary charged particles into vacuum gauges, and (2) the presence of intense noise sources such as electromagnetic interference in the way of output signal transmission and induction by commercial AC power lines. As a solution for (1), the method to prevent the intrusion of charged particles by applying appropriate potential to the double meshes surrounding gauges is considered. However, this method requires to make gauge size small, and necessitates the development of gauges whose K/lambda is larger than 5/Torr-cm, where lambda is the cube root of anode volume in cm, and K is the sensitivity of extractor type ionization gauges in $Torr^{-1}$. As a solution for (2), the method is considered, in which a modulator electrode is added to a gauge, and an AC amplifier is employed by modulating the ion current. The lock-in detection is especially effective for improving the S/N ratio. In this paper, the construction and the experimental results of the gauge to which those measures were applied are described. The experimental results include fundamental characteristics, the permeating rate of ions and modulation characteristic. Employing a hemispherical anode in the ion source, the production of the gauges smaller than 1/2 in size as compared with conventional extractor gauges is possible without decreasing the sensitivity.

54548 (KEK—81-2, pp 8-16) **Characteristics of three-grid type modulated Bayard-Alpert ionization gauge in ultra high vacuum region.** Kanaji, T.; Urano, T. (Kobe Univ. (Japan). Faculty of Engineering). Apr 1981. (In Japanese). NTIS (US Sales Only), PC A07/MF A01. (CONF-800194—).

From 3. meeting on ultra high vacuum techniques for accelerators and storage rings; Oho, Ibaraki, Japan (24 Jan 1980).

In Bayard-Alpert (B-A) ionization gauges widely used as total pressure-measuring gauges, the collector current is expressed as the sum of ion current Ii and soft X-ray photoelectron current Ix, if noise current is composed of only Ix. Ii and Ix are proportional to emission current Ie, respectively, and the pressure Px = α/S at which Ie is equal to Ix is called X-ray limit pressure, where α is X-ray current generating rate, and S is sensitivity coefficient. Therefore, it is necessary to make α smaller, and at the same time, to make S larger in order to reduce Px. But actually, the noise current is not composed of Ix only. Thereupon, the collector current other than true ion current in the lump is expressed as In, then the measuring limit pressure can be improved by epsilon n/kappa fold, where epsilon n and kappa are modulation coefficients of In and Ii, respectively. The authors have studied the three concentric cylindrical grid type modulated B-A gauge, and presently are working to try to make epsilon n smaller, putting the emphasis on holding the electric field around the collector constant. By the detailed consideration of the noise current of this gauge, it can be expected that the gauge holds linearity down to considerably low pressure region, but there are many problems to verify it. Thus this gauge is expected to be developed further for ultra-high vacuum application.

54549 (KEK—81-2, pp 33-39) **Simulation of acoustic delay line (ADL) system for light pipe in the radiated light facility by computer and analog circuits.** Okano, T.; Tominaga, G. (Tokyo Univ. (Japan). Faculty of Engineering). Apr 1981. (In Japanese). NTIS (US Sales Only), PC A07/MF A01. (CONF-800194—).

From 3. meeting on ultra high vacuum techniques for accelerators and storage rings; Oho, Ibaraki, Japan (24 Jan 1980).

Some examples of providing the safety systems to beam channels have been reported, in which fast shut-off vacuum valves and acoustic delay lines (ADL) are combined for the purpose of protecting the ultra-high vacuum in main rings from the intrusion of atmosphere if synchrotron radiation beam windows are broken. Therefore, as the delay characteristics of ADL against intruding gas, it is needed to delay the pressure rise at the outlet of ADL for a time more than that required for closing the fast shut-off vacuum valve. ADL delay characteristic is normally measured by the time delay until the pressure at the outlet of ADL reaches the upper limit from 10^{-3} to 10^{-4} Torr after the pressure at the ADL inlet was raised abruptly. The authors have considered the propagation of pressure inside the ADL as a problem of the transient characteristic of a non-equilibrium vacuum system, and numerically analyzed the effect of the shape of ADL on the delay characteristic for several models by the method of computer simulation. In parallel with the numerical simulation, the analysis of non-equilibrium vacuum system in the pressure range from molecular flow region to viscous flow region has been tried by electrical analog simulation. The authors report the result of the development of non-linear resistance circuits using two-element seal type LED-CdS photocouplers, required for the above analysis.

4208 Electronic Circuits And Devices

REFER ALSO TO CITATION(S) 53764, 53949, 54520, 54669, 54773

54550 (CONF-8308112—1) **Electron-drift velocity and ionization and attachment coefficients in gases/mixtures for diffuse-discharge opening switches.** Carter, J.G.; Hunter, S.R.; Christophorou, L.G.; Lakdawala, V.K. (Oak Ridge National Lab., TN (USA)). 1983. Contract W-7405-ENG-26. 8p. NTIS, PC A02/MF A01. Order Number DE83017206.

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

The data presented in this paper show that it is possible to find gases and gas mixtures which have the desirable drift velocity, electron attachment, and breakdown strength characteristics required for diffuse-discharge opening switch applications. Several such gases and gas mixtures have been identified and their approximate operating conditions have been indicated.

54551 (DOE/ER—0173) **Standard NIM digital bus (NIM/GPIB).** (USDOE Office of Energy Research, Washington, DC). Aug 1983. 18p. NTIS, PC A02/MF A01. Order Number DE83017865.

This document defines a standard digital data bus for NIM instruments as defined in Publication TID-20893 issued by the United States Atomic Energy Commission (now under the US Department of Energy). It utilizes the General Purpose Instrumentation Bus (GPIB) of ANSI/IEEE Std 488-1978 and the Code and Format conventions of ANSI/IEEE Std 728-1982 of the Institute of Electrical and Electronics Engineers (IEEE) and the American National Standards Institute (ANSI), together with additional requirements and recommendations in this document to maximize compatibility of NIM instruments utilizing the bus.

54552 (SAND—83-0665C) **Hermetically sealed microminiature multisocket connector.** Konnick, P.J. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 7p. (CONF-831182—1). NTIS, PC A02/MF A01. Order Number DE83017484.

From Electronic connector study group symposium; Philadelphia, PA, USA (14 Nov 1983).

Portions are illegible in microfiche products.

A unique hermetic microminiature multisocket connector was designed at Sandia as a means of interfacing with a sealed component package in a weapon system to ensure a controlled environment. Such a capability had not previously been available on any existing connector of comparable size and contact density. The connector is characterized by glass sealing of a high-density contact pattern, a weldable mounting flange, and by microminiature size.

This glass-to-metal sealing method, using individual glass beads, requires 51 holes on 50-mil centers in the web portion of the shell. As an alternative to the glass-to-metal method, the connector contacts and shell were redesigned for compatability with ceramic-to-metal sealing techniques. In this potentially lower cost, higher yield method, the metal web of the shell is replaced with a ceramic web containing 51 metallized holes on 50-mil centers. This report presents the design requirements for the hermetic microminiature multisocket connector; describes its physical and electricl characteristics; traces the testing and evaluation program as developed and evaluated by Sandia National Laboratories with the support of ITT Canon Electric Division of Phoenix, AZ; and describes the electrical and environmental test program performed by Bendix Corporation of Kansas City, MO.

54553 **(UCID—19877-Pt.1) Air-breakdown limits for microwave-pulse propagation. Part I. Experiments.** Byrne, D.P.; Alvarez, R.A.; Johnson, R.M. (Lawrence Livermore National Lab., CA (USA); EM Design, Dublin, CA (USA)). Sep 1983. Contract W-7405-ENG-48. 40p. NTIS, PC A03/MF A01. Order Number DE83017832.

We have measured breakdown power levels for short pulses of 2.856-GHz microwaves in a test section of WR-284 waveguide filled with air at several pressures in a range extending from 0.1 Torr to several hundred Torr. The traveling wave input to the test section was a pulse with a risetime of approximately 50 nonoseconds, a length of 100 ns (fwhm), and an amplitude of approximately 15 MW. Input power to the test cell and transmitted power were monitored with directional couplers and fast diodes: reflected power was also monitored on some measurements. Breakdown power for a given air pressure is defined as the power level (generally on the leading edge of the pulse) at which extreme attenuation of the transmitted pulse occurs. Although the present results must be considered preliminary, they are presented here because they are the only single-pulse microwave data that exist for pulse lengths below 100 ns. The data are compared with predictions of simple cascade theory, existing microwave breakdown data, video-pulse breakdown data, and recent LLNL fluid-model predictions.

54554 **(UCRL—88671) FET full-bridge switcher for inductorless capacitor charging for Nova.** Mihalka, A.M.; Burch, R.E.; Merritt, B.T. (Lawrence Livermore National Lab., CA (USA)). 1983. Contract W-7405-ENG-48. 5p. (CONF-830621—43). NTIS, PC A02/MF A01. Order Number DE83018005.

From IEEE power electronics specialists conference; Albuquerque, NM, USA (6 Jun 1983).

Switching power supplies were designed and exceeded the requirements of the Nova 10 mm rod amplifiers. A full bridge with fast recovery diodes is used to improve FET turn off and improve efficiency. The leakage reactance of the transformer effectively limits current so that an inductor is not required. The pulse width is programmable, making them variable frequency power supplies, and may be controlled by a computer or other device for special loads. Higher power can be attained by using heftier transformers and transistors and going to a 480 Vac, 650 Vdc bridge.

54555 **100 kW, 140 GHz pulsed gyrotron.** Temkin, R.J.; Kreischer, K.E.; Mulligan, W.J.; MacCabe, S.; Fetterman, H.R. (Massachusetts Inst. of Tech., Cambridge). *International Journal of Infrared and Millimeter Waves;* 3: No. 4, 427-437(1982). Contract AC02-78ET51013.

The design and operation of a 100 kW, 140 GHz pulsed gyrotron are reported. To our knowledge, this is the highest frequency at which high gyrotron output power ($\geq$ 100 kW) has been achieved. Results are presented for gyrotron operation in the range of magnetic field from 4 to 7 T, voltage from 23 to 80 kV and current up to 7.5 A. Near a value of magnetic field of 5.4 T, an output power of 100 kW was obtained at 140.4 GHz in single mode operation in the TE_{031} resonator mode.

4209 Waste Processing Plants And Equipment

54556 **Thermally actuated thermionic switch.** Barrus, D.M.; Shires, C.D. US Patent Application 6-430,579. 30 Sep 1982. 16p. Contract AT03-76SF71032.

A thermally actuated thermionic switch which responds to an increase of temperature by changing from a high impedance to a low impedance at a predictable temperature set point. The switch has a bistable operation mode switching only on temperature increases. The thermionic material may be a metal which is liquid at the desired operation temperature and held in matrix in a graphite block reservoir, and which changes state (ionizes, for example) so as to be electrically conductive at a desired temperature.

4210 Combustion Systems

REFER ALSO TO CITATION(S) 54364, 54367

54557 **(DOE/ET/17091—1355) Electrocyclone Development Program. Quarterly technical report, November-January 1982.** (General Electric Co., Schenectady, NY (USA). Advanced Energy Programs Dept.). 1982. Contract AC21-80ET17091. 32p. (FE—7091-30). NTIS, PC A03/MF A01. Order Number DE83006356.

Portions are illegible in microfiche products.

This investigation implies that typical high performance cyclone designs are inhibited in two significant areas. With small inlets and small outlets, it appears that large scale turbulence inhibits its collection. The use of a large inlet contracting the flow into a relatively narrow annular region minimizes the production of large scale turbulence. Similarly, increased engagement length improves the length-to-annulus width and suppresses the turbulence that is formed. It is postulated that inlet vanes or baffling might play a similar role. The use of air shielding is found to be an alternative means of performance improvement and is of special interest in systems that can use clean dilution gas, e.g., cyclone combustors.

54558 **(DOE/ET/17091—1356) Electrocyclone Development Program. Quarterly technical report, February-April 1982.** (General Electric Co., Schenectady, NY (USA). Advanced Energy Programs Dept.). 1982. Contract AC21-80ET17091. 44p. (FE—7091-31). NTIS, PC A03/MF A01. Order Number DE83006355.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The performance analysis of the 36-inch diameter, air-shielded electrocyclone has been completed. The cyclone was equipped with a spiked-disk electrode near the exit tube region and tested over the 15 to 80 ft/s velocity range. A set of light dust loading tests were performed where cyclone overall and fractional efficiencies were measured. In addition, a set of heavier dust loading tests with flyash were performed to investigate space-charge effects. A series of geometrically similar cyclones of conventional, high efficiency design was tested for collection efficiency at diameters of 4, 12, and 36 inches with both flyash and nickel test dusts over a range of inlet velocities and at atmospheric conditions. The degree of correlation obtained was examined to assess the validity of scale-up from model to prototype size. (LEW)

54559 **(DOE/MC/12233—T1) Development of a pressurized fluidized-bed combustor model.** Rao, P.R.; Wen, C.Y. (West Virginia Univ., Morgantown (USA)). Nov 1979. Contract AT21-79MC12233. 66p. NTIS MF A01. Order Number DE83017915.

Microfiche only, copy does not permit paper copy reproduction.

A simple pressurized fluidized bed combustion model is developed for computer simulation taking into account the following elements: devolatilization of coal and the subsequent combustion of volatiles and residual char; sulfur dioxide capture by limestone; attrition and elutriation of char and limestone; bubble hydrodynamics for computing emulsion phase oxygen concentration; and overall heat and mass balances. Empirical correlations are developed for devolatilization, SO_2 retention efficiency, elutriation and NO/sub x/ emissions. The model is able to simulate most of the important performance characteristics. The package program is developed and has been tested with various operating conditions. Input to and output from the computer program are presented. Also given are a flowchart and program listing and a manual for use. (LEW)

54560 **(DOE/MC/14129—1463) 20-atmosphere rig PFBC test results: Tests 10 and 12. Investigations into the use of limestone as a sorbent.** (National Coal Board, Leatherhead (UK). Coal Utilization Research Lab.). Aug 1983. Contract AC21-80MC14129. 103p. NTIS, PC A06/MF A01. Order Number DE83015869.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Tests have been carried out in a 1 ft x 1 ft pressurised fluidised-bed combustor with the objective of assessing the use of limestone as the SO_2 sorbent. Operating conditions ranged from 10 to 16 atm pressure; 3 to 4 ft/s fluidising velocity and 1320°F to 1560°F bed temperature. Two limestones of different reactivity were used. Both were inferior in terms of sulphur capture when compared with data obtained using Plum Run dolomite, and one limestone was markedly inferior to the other. The coals were Pittsburgh No. 8 and a high-ash subbituminous coal. Serious sintering of bed material was experienced when burning the Pittsburgh No. 8 coal with limestone as the sorbent. Particles became bonded together to form larger particles until defluidisation occurred at some conditions. This phenomenon had not been observed previously with dolomite as the sorbent, nor was it observed when burning the sub-bituminous coal which had an ash with high fusion temperature characteristics.

4220 Underground Engineering

REFER ALSO TO CITATION(S) 53401

4240 Pollution Control Equipment

REFER ALSO TO CITATION(S) 53385, 53391, 53392, 54557, 54558, 54560

54561 **(PB—83-207639) Nox abatement for stationary sources in Japan. Final report, January 1982-January 1983.** Ando, J. (Chuo Univ., Tokyo (Japan)). May 1983. 524p. NTIS, PC A22/MF A01.

The report is a compilation of information on the current status of NOx abatement technologies for stationary sources in Japan, where strict ambient air quality standards for SO2 and NOx mandate the use of various air pollution control technologies. The author obtained this information from electric power companies, various industries, and developers of numerous technology processes, as well as from his own original research in the field. The report focuses on the Combustion Modification (CM) and Selective Catalytic Reduction (SCR) NOx abatement technologies. Information is provided on the development status, pilot and demonstration plant tests, technological problems, and costs associated with the use of these technologies in Japan. Detailed operating data are given to describe the commercial operation of SCR plants.

43 PARTICLE ACCELERATORS

4301 Design, Development, And Operation

REFER ALSO TO CITATION(S) 55306

54562 **(IFVE-OI—81-125) Estimations of cavity loading by beam for the linac injector for booster and initial consideration for construction of the power input and RF field stabilization systems.** Mazurov, E.V.; Mal'tsev, I.G.; Nagaev, V.I. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1981. 16p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702977.

The engineering estimation technique for linac cavity loading by beam at maximum fixed RF generator power and various tuning regimes of the power input system are described. The quantitative estimation results of cavity loading by beam for the linac-injector for booster accelerator are presented. The efficiency of various schemes of the power input systems have been analysed. The requirements to adjestment range and to fast-operation of RF field stabilization systems have been produced. The estimation results surved as basis for development of the RF power supply system for this accelerator. This results are experimentally confirmed.

54563 **(IFVE-OI—81-126) Study on transition processes in the stabilization system with HF feedback coupler.** Mal'tsev, I.G.; Nagaev, V.I. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1981. 16p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702978.

The analytic expressions for description of transition processes in the stabilization system with HF opposite-coupler on reflectional voltage wave from the cavity have been obtained with the help of the spectral method. This stabilization system is used in the HF power supply system for the URAL-30 accelerator. The comparison results of quantitative calculation and experimental testing are given. The method allowing for delay time in feedback circuit is indicated. xperimental testing are given. The method.

54564 (INS-NUMA—28, pp 86-92) **Low velocity linac.** Arai, S.; Tokuda, N.; Nakanishi, T. (Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study). Apr 1981. NTIS (US Sales Only), PC A07/MF A01. (CONF-8010330—).

From Symposium on inertial fusion with heavy ion beam; Tokyo, Japan (22 Oct 1980).

Low-beta linacs are the important element in the driver system for heavy ion beam inertial fusion, and several accelerator structures have been considered for them. The objectives of the low-beta linacs used for the drivers are to obtain good capture efficiency for the injection beam, to accelerate high current ion beam, and to make the growth of emittance as small as possible. The RFQ structure is considered as the most suitable to the low-beta linacs, and its preliminary design is reported in this paper. The principle and characteristics of the RFQ are explained. The electric field in the structure accomplishes three functions of bunching, accelerating and focusing beam. Even at very low injection energy, the RFQ can give the capture efficiency in excess of 90% for adiabatic bunching. The four chamber resonator composed of a cylindrical tank and four venes carries out the job. The limiting of beam current due to the space charge effect, the beam loading effect on the accelerating field, and the rate of growth of the normalized emittance are described. An example of the design of an RFQ linac for U-238(1+) is shown. The beam from a 500 kV Cockcroft-Walton preinjector is accelerated up to 300 keV/u with 95% capture efficiency. The limiting current larger than the beam current required for low-beta linacs was obtained.

54565 **(KFTI—82-10) Development and investigation of electromagnetic characteristics for modifications of accelerating structure of heavy ion linear accelerator.** Bomko, V.A.; D'yachenko, A.F.; Pipa, A.V.; Khizhnyak, N.A. (AN Ukrainskoj SSR, Kharkov. Fiziko-Tekhnicheskij Inst.). 1982. 46p. (In Russian). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83703006.

A review on large-scale investigations on the development of effective accelerating structure, supposed to be used to accelerate heavy ions of wide mass and energy ranges, is presented. The investigations of different structure modifications of pins, placed opposite, with drift tubes, excited on H_0 wave, has shown that the most suitable is the structure of the type "Muravej". The peculiarities of the modification are as follows: all odd drift tubes are fitted on the general plate-suspension, and even ones have three rods, one of which is mounting, and two others, being carrier-current and tuning, are placed symmetrically relatively to the first rod in the azimuthal surface. Methods of cell tuning to the assigned frequency and receipt of uniform distribution of accelerating field longitudinally the structure are developed. The results of investigations of h. f. characteristics of the mentioned accelerating structure type - the model of the base unit of linear accelerator of multicharged ions on 1:6 scale, are described.

54566 **(SAND—83-0524C) IBEX - a pulsed power accelerator that generates no prepulse.** Ramirez, J.J.; Corley, J.P.; Mazarakis, M.G. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 7p. (CONF-830911—3). NTIS, PC A02/MF A01. Order Number DE83017560.

From 5. international conference on high power particle beams; San Francisco, CA, USA (12 Sep 1983).

Portions are illegible in microfiche products.

Intense relativistic electron beams are produced in vacuum diodes driven by pulsed power accelerators. For pulse widths ~ 100 nsec, pulse forming lines (PPL) are used to generate the accelerating voltage pulse. This pulse is produced by sequential switching of stored energy through two or more stages. Capacitance and/or inductive coupling usually results in the generation of a low level prepulse voltage some time during the switching sequence. This prepulse is known to have a substantial effect on the performance of the vacuum diode during the main accelerating pulse. Most accelerators use various schemes for reducing this prepulse to acceptable levels. The Isolated Blumlein PPL concept was developed at Sandia to allow for the generation of the main accelerating pulse without generating a prepulse voltage. This concept was implemented into the IBEX accelerator that generates a 4 MV, 100 kA, 20 nsec output pulse. Design and performance data are presented.

54567 **Radio-frequency quadrupole resonator for linear accelerator.** Moretti, A. US Patent Application 6-435,181. 19 Oct 1982. 17p. Contract W-31-109-ENG-38.

An RFQ resonator for a linear accelerator having a reduced level of interfering modes and producing a quadrupole mode for focusing, bunching and accelerating beams of heavy charged particles, with the construction being characterized by four elongated resonating rods within a cylinder with the rods being alternately shorted and open electrically to the shell at common ends of the rods to provide an LC parallel resonant circuit when activated by a magnetic field transverse to the longitudinal axis.

4302 Beam Dynamics, Field Calculations, And Ion Optics

REFER ALSO TO CITATION(S) 54614

54568 **(AD-A—126864/8) Mode coupling in the modified betatron. Memorandum report.** Chernin, D. (Naval Research Lab., Washington, DC (USA)). 19 Apr 1983. 34p. (NRL-MR—5061). NTIS, PC A03/MF A01.

The effects of quadratic non-linearities in the single particle equations of motion on electron orbits in the modified betatron are studied. Strong coupling of the two modes of betatron oscillation is found to occur for a particular value of the ratio B sub theta/B sub z, unless the gradient in the field index takes a certain value. In general, in the azimuthally symmetric case, the mode coupling appears to be quite harmless. When field and/or focusing errors are present the mode coupling reduces the effect on the orbit of the lambda - 1 orbital resonance but does not do so sufficiently so that the lambda = 1 resonance could be safely passed through in a practical device.

54569 **(AD-A—126937/2) Numerical simulation of the axisymmetric hollowing instability. Memorandum report.** Joyce, G.; Lampe, M. (Naval Research Lab., Washington, DC (USA)). 14 Apr 1983. 41p. (NRL-MR—5053). NTIS, PC A03/MF A01.

Recent simulations have indicated that highly current-neutralized charged particle beams propagating in an ionizable gas are subject to violent axisymmetric instabilities. We show that these instabilities are excitations of the m = O, n = 2 hollowing mode, for which there is no adequate analytic theory. We present results of a wide-ranging simulation study of the instability mechanism and the parameter range of the instability.

54570 **(AD-A—127018/0) Extraction and propagation of an intense rotating electron beam.** Adler, R.J.; Kiuttu, G.F.; Hughes, T.P. (Mission Research Corp., Albuquerque, NM (USA)). Oct 1982. 35p. NTIS, PC A03/MF A01.

A hollow electron beam produced in a strong axial magnetic field has been extracted into a neutral gas cell where the magnetic field is zero. Due to radial magnetic field in the transition region, the beam rotates and maintains its hollow profile. Equilbrium is provided by the vz x b0 inward force and centrifugal outward force. We have studied both extraction and propagation phenomena in this configuration. Measurements include beam and net currents, beam generated axial magnetic fields, beam rotation and emittance, and light produced. A filamentation instability has been observed outside the magnetic field in this configuration. Beam equilibrium results are also presented and are compared with both experiment and numerical simulation.

54571 **(AD-A—128242/5) Drag instability in the modified betatron. Memorandum report.** Sprangle, P.; Kapetanakos, C.A. (Naval Research Lab., Washington, DC (USA)). 16 May 1983. 32p. (NRL-MR—4950). NTIS, PC A03/MF A01.

The instability discussed in this report is a special case of the resistive wall instability. It occurs when the beam current, that propagates inside a resistive vacuum chamber along an external toroidal magnetic field, exceeds a critical value. The drag instability is characterized by uniform density in the direction of propagation, i.e., the toroidal wave number is zero. The authors have studied the drag instability over a wide range of parameters, including the limit theta greater than (b-a) where delta is the skin depth and (b-a) is the thickness of the conducting wall. This limit is relevant to the proof-of-principle experiment on the modified betratron accelerator presently under design at the Naval Research Laboratory.

54572 **(AD-A—130127/4) High current betatron stability and injection studies.** Hughes, T.P.; Godfrey, B.B.; Campbell, M.M. (Mission Research Corp., Albuquerque, NM (USA)). 1983. 11p. NTIS, PC A02/MF A01.

MRC Contributing In Several Areas of High Current Cyclic Induction Accelerator Research: (1) Linear Theory of Negative Mass and Resistive, Wall Instabilities in Modified Betatron, (2) Linear Theory of Beam Breakup Instability in Recirculating Induction Accelerator, (3) Single-Turn Injection Simulation for Modified Betatron, (4) Multi-Turn Injection Simulation for Conventional Betatron, and (5) Negative Mass Instability Saturation Simulation. Presentation reviews negative mass saturation, negative mass linear theory, multi-turn injection.

54573 **(AD-A—130149/8) Beam breakup instabilities in high current electron beam racetrack induction accelerators.** Godfrey, B.B.; Hughes, T.P. (Mission Research Corp., Albuquerque, NM (USA)). 22 Apr 1983. 33p. NTIS, PC A03/MF A01.

Beam breakup and negative mass instability growth rates for a 1 kA, 40 MeV electron beam racetrack induction accelerator are computed. The device is taken to have four accleration gaps, each with 0.2 MeV applied voltage and 15 ohm transverse impedence; the guide field is 2 kg. We find that the total amplification of the beam breakup mode is limited to five e-findings provided that the cavity mode quality factor Q is 6. Thus, the negative mass instability, which grows several times faster, is the dominant consideration. However, we also find that they energy range over which the negative mass instability occurs can be narrowed substantially by reducing the guide field strength after the beam has been accelerated to about 12 MeV. This approach, coupled with beam thermal effects, not considerated here, probably is sufficient to limit negative mass growth to acceptable levels in the racetrack accelerator.

54574 **(ANL-HEP-CP—83-47) Relativistic-beam Pickup Test Facility.** Kramer, S.L.; Simpson, J.; Konecny, R.; Suddeth, D. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 4p. (CONF-830822—26). NTIS, PC A02/MF A01. Order Number DE83017929.

From 12. international conference on high energy accelerators; Batavia, IL, USA (11 Aug 1983).

Portions are illegible in microfiche products.

The electrical response of pickups and cavities to charged particle beams has been an area of considerable activity and concern for accelerator systems. With the advent of stochastic beam

cooling, the position and frequency response of beam pickups has become a crucial parameter in determining the performance of these systems. The most frequently used method for measuring and calibrating beam pickups has been the use of current carrying wires to simulate relativistic beams. This method has sometimes led to incorrect predictions of the pickup response to particle beams. The reasons for the differences are not always obvious but could arise from: (1) wires are incapable of exciting or permitting many of the modes that beams excite or (2) the interaction of the wire with large arrays of pickups produce results which are not easily predicted. At Argonne these deficiencies are resolved by calibrating pickups with a relativistic electron beam. This facility is being used extensively by several groups to measure beam pickup devices and is the primary calibration facility for pickups to be used in the FNAL TEV-I Antiproton Source.

54575 **(BNL—33532) Resonance behavior in the presence of space charge.** Month, M.; Weng, W.T. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 9p. (CONF-830822—19). NTIS, PC A02/MF A01. Order Number DE83017578.

From 12. international conference on high energy accelerators; Batavia, IL, USA (11 Aug 1983).

An analysis is presented of the resonance behavior of particle beams in the presence of space charge fields. Since self-consistent requirements are ignored, the results describe onset or early behavior. It is shown that in a beam of uniform current resonances excited by magnetic field errors are stabilized by the detuning effect of the self-field space charge force. This situation is changed when a radiofrequency accelerating field is applied. As beam bunching results after rf turn-on, the space charge force becomes modulated along the bunches, vanishing at the ends. At these regions of small or vanishing space charge, stabilization from nonlinear detuning tends to disappear, thus leaving particles susceptible to resonance blow-up. This picture of the effect of beam bunching can be studied by considering the phase space structure for particles at different positions along the bunches. A somewhat unusual conclusion is made on the use of this analysis to model beam capture in a synchrotron at low energy.

54576 **(BNL—33535) Warm measurements of CBA superconducting magnets.** Engelmann, R.; Herrera, J.; Kahn, S.; Kirk, H.; Willen, E.; Yamin, P. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 3p. (CONF-830822—18). NTIS, PC A02/MF A01. Order Number DE83017581.

From 12. international conference on high energy accelerators; Batavia, IL, USA (11 Aug 1983).

We present results on magnetic field measurements of CBA dipole magnets in the warm (normal conductor) and cryogenic (superconducting) states. We apply two methods for the warm measurements, a dc and ac method. We find a good correlation between warm and cryogenic measurements which lends itself to a reliable diagnosis of magnet field errors using warm measurements early in the magnet assembly process. We further find good agreement between the two warm measurement methods, both done at low currents.

54577 **(IFVE-OI—81-173) Three-dimensional electrostatic field computation for an accelerating structure with spatial-uniform focusing.** Zherebtsov, A.V. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1981. 11p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702979.

The method of three-dimensional electrostatic field computation for accelerating structures with spatial-uniform focusing is proposed. The estimation of the computation accuracy for electrostatic potential is given. The computation of the efficiency of the acceleration and maximum electric field in the initial part of the "URAL 30" accelerator are made using this method. This method can be applied for computation of noncircular electrodes, which gives the possibility of optimization of their shape from the point of view of focusing field linearity in the area of interaction and decreasing the maximum intensity of the electric field.

54578 **(IFVE-OI—82-160) Measurement of the threshold and nominal values of HF fields in the cavities of the linac with HF focusing.** Zenin, V.A. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1982. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702980.

The method for measuring thresholds and nominal values of RF fields in the linac cavities is proposed. Some peculiarities of measuring these parameters are considered. The threshold values of RF fields in the accelerator initial part (AIP) are measured. by the following technique. All sections besides AIP are switched off. The 2 MeV beam passed through the whole accelerator channel is deflected by means of a magnetic analyser and s guihided to te Faraday cylinder, which is covered by luminophor. By the luminophor spot size the particle spectrum width at the AIP given field level is timated. Then the ependence of spectrum with and its position on the energy axis on the AIP field level is measured. The threshold is determined by the moment of spectrum shift and its disappearance. The thresholds in the rest of the accelerator sections are determined by the similar technique. Experimental results for the RF quadrupole focusing linear accelerator, which is the injector of the IHEP proton synchrotron booster, are presented.

54579 **(IFVE-OP—82-130) Slaw extracted proton beam formation and monitoring for the "QUARTZ" setup.** Bushnin, Yu.B.; Gres', V.N.; Davydenko, Yu.P. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1982. 12p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702981.

The version of optical mode of the beam channel providing with simultaneous operating the experimental setups FODS and "QUARTZ" at consecutive usage of the slow extracted proton beam is reported. The "QUARTZ" setup beam diagnostics system comprises two subsystems: for measuring beam profile beam timing structure and beam intensity and operates in the beam extraction duration from 20 ns to few seconds at beam intensity from 10^{10} to $5x10^{12}$ protons/pulse. The "QUARTZ" setup represents a focusing crystal-diffraction spectrometer with 5-meter focal distance and Ge(Li) special construction detector. High efficiency target is applied in the setup. The "QUARTZ" setup is designed for studying exotic atoms produced by negative charged heavy particles (π, K, Σ, anti P) and atomic nuclei. Precise energy measurement of X ray transitions in such atoms is performed. For measuring beam geometric parameters 32-channel secondary emission chambers are used. As detector of beam intensity and timing structure of slow extracted beam the secondary emission chamber is employed. The principle circuit of current integrator is given. As data transmission line a 50-pair telephone cable is used. Information conversion into digital form and its subsequent processing is performed in the CAMAC system and the SM-3 computer. The proton beam full intensity measuring system provides with accuracy not worse than +-4.5% in the 10^{10}-10^{12} proton/sec range. The implemented optical mode of the beam channel and proton beam monitoring system began fulfillment of the experimental program on the "QUARTZ" setup.

54580 **(INR—1900/24/PL/A) Program LINEL of calculation of resonant structures for linear accelerators.** Kulinski, S.; Savlevich, L. (Institute of Nuclear Research, Warsaw (Poland)). 1980. 31p. (In Russian). Energetics and Atomic Energy Information Centre, Warsaw, Poland.

The program LINEL is designed for finding resonant accelerating structures of linear accelerators. Mathematically it is the eigenvalue problem for the partial differential equation of the second order of the elliptic type with the mixed Dirichlet and Neuman conditions on the boundaries. The problem is solved by the SOR (Successive Over-Relaxation) method. The program LINEL is written for the CYBER-73 computer and as the basis for it the CERN program CLAS was used.

54581 **(INS-NUMA—30) Measurement of the RF field on RFQ linac model cavities.** Nakanishi, T.; Ueda, N.; Arai, S.; Hori, T.; Takanaka, M. (Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study). Jan 1982. 83p. NTIS (US Sales Only), PC A05/MF A01. Order Number DE83702983.

The results of experimental studies on rf characteristics of a four vane RFQ cavity are described. Two model cavities were fabricated. With the first model, which has a set of straight vanes, has given a guide line for the loop coupling and the tuning method to get a uniform field. The second model, manufactured with closer tolerance, has two kinds of vanes, straight and modulated. For the straight vanes, the measured resonant frequency is 296.0 MHz for the TE210 mode and agrees well with the calculated value 296.5 MHz using of the computer code SUPERFISH. The measured one is 293.5 MHz for the modulated vanes which have the same cross section as the straight vane at their quadrupole symmetry plane. The measured electric field distribution in the acceleration bore agrees with the calculated one within the measurement error. A sufficient mode separation bigger than 1% and uniform field distribution within a few percent have been obtained with a single loop coupler which matches the cavity to the feeder line.

54582 **(INS-NUMA—32) Measuring system of multipole fields of the quadrupole magnet in drift-tubes of a linear accelerator.** Noda, A.; Yoshizawa, M.; Mutou, M.; Fujino, T. (Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study). Feb 1982. 21p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702984.

A measuring system for the field of a quadrupole magnet with a small bore radius in a drift tube linac is fabricated. The induced voltage at a rotating coil, the rotating axis of which is adjusted to the magnet axis, is analysed by a Fast Fourier Transformer (FFT). The measuring time can be made shorter with the use of an FFT. By calibration in a uniform field, the field gradient can be evaluated without the use of coil dimension. The accuracy of the measurement is better than +-8%. This system is applied to a permanent quadrupole magnet and its field gradient and sextupole components are measured to be 2.1 kG/cm and 0.81 G/cm^2.

54583 **(JINR—9-82-357) Experimental determination of the nuclear reaction yield uses for beam diagnostics of the KUTI prototype.** Sarantsev, V.P.; Tyutyunnikov, S.I. (Joint Inst. for Nuclear Research, Dubna (USSR). Dept. of New Acceleration Methods). 1982. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702989.

Experimental results on the of activity yield along Esub(γ)=511 keV line to one ion for the reaction of nitrogen ions with D_2, Na, Ti targets, which have been obtained of the heavy ion linear accelerator of the Central Institute of Physics (Bucharest) are presented. On the basis of the data obtained parameters of ions accelerated on KUTI prototype (JINR) are determined more precisely.

54584 **(JINR—9-82-515) Residual magnetic field in the magnet of the Dubna synchrophasotron and its compensation.** Zabolotin, V.P.; Isaev, A.S.; Perfeev, V.N.; Fedukov, S.V.; Sherstyanov, D.I.; Yalovoj, I.N. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1982. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702990.

Data are presented on the distortion of the of the magnetic field inhomogeneity index (n) and the beam orbit in the radial direction by the residual magnetic field H_0 when operating without a demagnetization system and with five cycles and one cycle of demagnetization. Results are described of correcting the distribution for the radius of the magnetic field index to n=0.65 at the initial stage of acceleration without the demagnetization system. It is shown that the distortion of the magnetic field at one cycle of demagnetization at a current of 800 A is small as at five cycle demagnetization. However, the transition from five cycle of demagnetization to one made it possible to decrease an interval between cycles of the leading magnetic field. Due to this, the frequency of alternation of cycle has been increased by a factor of > 1.5.

54585 **(JINR—13-82-587) Plastic scintillation monitor for methodical investigation of track detectors on the JINR synchrophasotron.** Golovin, V.M.; Zarubin, A.V.; Lustov, N.M.; Omel'yanenko, A.A.; Fedunov, A.G.; Kharin, A.M. (Joint Inst. for Nuclear Research, Dubna (USSR). Dept. of New Acceleration Methods). 1982. 4p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702988.

The structure of the monitor is described. It consists of 5 counters with scintillators-plates in each, and 1 counter with "comb" scintillator which are located on the length of 18 m. The monitor provides the beam control, trace and time information measurements, start-up of the detector read-out systems and of the computer. Some examples of profiles of the beam and of the "comb"-scintillator measurements are presented. The monitor permits to investigate characteristics of drift and proportional chambers, drift tubes, to measure charged particle beam parameters.

54586 **(JINR-R—9-82-502) Orbit correction in a heavy-ion synchrotron.** Dinev, D.Kh. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1982. 19p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702994.

The orbit correction in a heavy-ion synchrotron in the project of an accelerating complex is considered. The orbit dispersion and the statistical properties of the orbit maximum distortion are calculated. A computer simulation of the orbit and its correction are presented. A suggestion in made concerning the quantity and disposition of pick-up electrodes and correcting magnets. It is shown how to correct the orbit using the "beam-bump" method or the harmonic method or the dynamic method of correction.

54587 **(JINR-R—9-82-504) Orbit correction in synchrotrons. Review.** Dinev, D.Kh. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1982. 16p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702995.

The errors giving rise to orbit distortions are pointed out as well as the Hamiltonian when these errrors are presented. The orbit equation and the basic methods of its solution are given. The statistical properties of the perturbations of the orbit and its maximum distortion are discussed in details. A classification of the methods of orbit correction is done. The "beam-bumb" method is considered at a random disposition of pick-up electrodes and correcting magnets. A detailed description of the harmonic method, the least square method and the Hereward-Baconnier method is given. The dynamic method of correction, proposed by the author, is discussed. The case of irregular disposition of pick-up electrodes and the orbit correction on the first turn are considered.

54588 **(KEK—81-11) BSF beam line.** Irie, Y.; Kumada, M.; Sakai, I.; Sasaki, H.; Someya, H. (National Lab. for High Energy Physics, Oho, Ibaraki (Japan)). Oct 1981. 32p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83702997.

A beam line has been constructed to transport the proton beam of the 500 MeV Booster Synchrotron to a new experimental facility, Booster Synchrotron Utilization Facility (BSF), which consists of those for neutron scattering experiments, researches of meson science and medical use of the booster beam. This report describes general features and detailed design parameters of the beam optics of the line. And also a brief description is given on the magnets and vacuum system for the beam line.

54589 **(KEK—81-14) Closed orbit correction in accumulation ring of TRISTAN.** Kawabe, T. (National Lab. for High Energy Physics, Oho, Ibaraki (Japan)). Nov 1981. 19p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702999.

The correction of the closed orbit distortion (COD) is examined through the numerical simulation to the accumulation ring of TRISTAN project by using the iterative method based on the least squares theory. It is shown that a small number of correctors can effectively diminish the COD due to the field and alignment errors. It is also pointed out that the number of the correctors used is se-

verely restricted by the effect of errors which are inevitably introduced in the process of the COD correction.

54590 **(KEK—81-15) Note on depolarizing resonances in the KEK 12 GeV synchrotron.** Khoe, T.K. (National Lab. for High Energy Physics, Oho, Ibaraki (Japan)). Dec 1981. 15p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703000.

A simple derivation of the spin motion equation and its solution are given. The effect of the distribution of the vertical betatron oscillation amplitude on the beam polarization is examined. Methods to reduce the depolarization are discussed.

54591 **(KEK—81-19) Improvement of radiative polarization in plane storage rings.** Yokoya, K. (National Lab. for High Energy Physics, Oho, Ibaraki (Japan)). Mar 1982. 22p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703002.

The problem is discussed to get high degree of polarization in an electron storage ring without a spin rotator. It is found that the strength of depolarization resonance with horizontal betatron oscillation can be reduced through the control of Fourier harmonics of spin precession and that the resonance with vertical oscillation can be eliminated by a careful design of linear optics.

54592 (LBL—15973, pp 172-173) **Rates and time structure expected from $\sqrt{s} = 40$ TeV colliders.** Diebold, R. (Argonne National Lab., IL). Apr 1983. NTIS, PC A09/MF A01. (CONF-830224—).

From DPF workshop on collider detectors: present capabilities and future possibilities; Berkeley, CA, USA (28 Feb 1983).

Luminosities and time structure for anti p p and pp colliders were examined at the DPF Snowmass meeting, and the results are summarized here as input for the design of detector components and systems. For bunched beams, the need to separate the beam orbits before the next bunch meeting gives a spacing between bunch collisions of about 800 nsec for anti p p and 100 nsec for pp. For the beam emittance assumed, as many as 25 interactions per bunch collision should be possible giving luminosities of up to 3 x 10^{32} and 2.5 x 10^{33} $cm^{-2}sec^{-1}$ for anti p p and pp, respectively. Unbunched pp beams give a better duty cycle, but require greater beam intensities for a given luminosity. Synchrotron radiation will damp the beams at these high energies and may allow one to maintain constant luminosity during a run.

54593 **(SLAC-PUB—2946) Coherent instabilities of a relativistic bunched beam.** Chao, A.W. (Stanford Linear Accelerator Center, CA (USA)). Jun 1982. Contract AC03-76SF00515. 87p. (CONF-8208147—4). NTIS, PC A05/MF A01. Order Number DE83007024.

From SLAC summer school on high-energy particle accelerators; Stanford, CA, USA (2 Aug 1982).

Portions are illegible in microfiche products.

A charge-particle beam contained in an accelerator vacuum chamber interacts electromagnetically with its environment to create a wake field. This field than acts back on the beam, perturbing the particle motion. If the beam intensity is high enough, this beam-environment interaction may lead to an instability and to subsequent beam loss. The beam and its environment form a dynamical system, and it is this system that will be studied. 84 references.

54594 **(UCRL—89227) Variable-emittance filter for the Electron Laser Facility.** Paul, A.C.; Sessler, A.M.; Wurtele, J.S.; Caporaso, G.J.; Cole, A.G. (Lawrence Berkeley Lab., CA (USA); Lawrence Livermore National Lab., CA (USA)). 1 Aug 1983. Contract W-7405-ENG-48. 15p. (CONF-8306121—1). NTIS, PC A02/MF A01. Order Number DE83017617.

From 4. workshop on free-electron laser devices; Eastsound, WA, USA (27 Jun 1983).

We describe a variable-emittance filter designed for the Electron Laser Facility (ELF). The filter attenuates the 4.5-MeV, 6-kA Experimental Test Accelerator (ETA) beam, permitting electrons only which fall within a given region of phase space (r, dr/dz) to pass. Initial experimental results are presented.

4303 Auxiliaries And Components

REFER ALSO TO CITATION(S) 54374, 54474, 54510, 54511, 54547, 54579, 54678, 54706, 54707, 54727, 54729, 55127, 55133, 55135, 55137, 55190

54595 (ARL/TR—050, pp 32-38) **Linear accelerator facility.** Webb, D.V.; Thomson, J.E.M. Jan 1983. NTIS (US Sales Only), PC A08/MF A01.

In Annual review of research projects 1981.

Plans for the installation of an electron linear accelerator are outlined. The effectiveness of the shielding has been studied with a general purpose shielding Monte Carlo computer code for gamma-ray transport.

54596 **(BNL—33116) Brookhaven Double MP Facility - recent developments and plans for the future.** Thieberger, P. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 34p. (CONF-8304105—5). NTIS, PC A03/MF A01. Order Number DE83013279.

From 6. international tandem conference; Chester, UK (16 Apr 1983).

Portions are illegible in microfiche products.

The Brookhaven Tandem Van de Graaff facility consists of two model MP accelerators which have been extensively modified and improved over the years. Recent accelerator developments leading to a maximum terminal voltage of 16.5 MV for one of the machines include an increase of the active length of the acceleration tubes, installation of vacuum pumps at intermediate field-free sections, installation of smooth high-voltage-terminal shields and the implementation of a system for individual acceleration-tube conditioning. A new cylindrical voltage-divider resistor-shield arrangement has been tested and will be installed. A novel 4-stage mode of operating the tandems provides variable low-energy highly-charged heavy ions used for atomic-physics experiments. This type of operation has been improved by the addition of a removable gridded lens at the exit of the last acceleration tube. Plans for the future include the production of relativistic heavy ions by injecting beams from the tandems into the AGS 30-GeV proton accelerator at BNL either directly or via a tandem booster cyclotron. For this purpose, a high-intensity pulsed-beam system was developed and tested.

54597 **(BNL—33536) AGS polarized proton project.** Halama, H.J. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 5p. (CONF-830822—17). NTIS, PC A02/MF A01. Order Number DE83017582.

From 12. international conference on high energy accelerators; Batavia, IL, USA (11 Aug 1983).

Portions are illegible in microfiche products.

At the end of this year, polarized H^- beam will be injected into the AGS, where it will be stripped and subsequently accelerated to 26 GeV/c. 20 keV polarized H^- are produced in an ion source working at ground potential by colliding polarized H^0 with cesium beams and 12 μA of H^- have already been achieved in 0.5 ms pulses. 20 keV beam is transported to an RFQ linac where it is accelerated to 750 keV. 750 keV LEBT line matches the RFQ output emittance to the acceptance of the existing 200 MeV linac to reach the desired AGS injection energy. The degree of polarization will depend critically on how well we can cross some 30 depolarizing resonances in the AGS. They can be divided into two types: (1) intrinsic resonances due to natural periodicity of the AGS will be crossed in less than one revolution ($\sim$ 2 μs) by a fast tune jump generated by 12 fast quadrupoles and their modulators, and (2) imperfection resonances due to magnet misalignment will be minimized by generating harmonic correction using 96 existing dipole magnets. In addition, all existing AGS multipoles will be programmed to tailor the tune and chromaticity during the acceleration to further facilitate resonance crossing. In order to insure rapid tune up and commissioning of polarized beams, four independent polarimeters will be used to measure polarization.

54598 **(CAPE—2867) SLAC RHONDA-TAC test router module: LD 135-396-00-R0 Logic Diagram (Engineering Materials).** (Stanford Linear Accelerator Center, CA (USA)). 1983. Contract AC03-76SF00515. USDOE-TIC, PO Bx 62, Oak Ridge, TN 37830.

Portions are illegible in microfiche products 35-mm aperture cards.

The logic diagram listed provides the basic ideas for designing a TAC (Time to Analog Converter) tester as used at SLAC. The device is built in a double width CAMAC module and is used to simulate the Detector chamber beam pulses, clear, and stop signals in their proper relationship, thus providing the TAC module with simulated pulses for calibration, checkout and condition. The device was used with the SLAC SPEAR storage ring and the MARK II Detector.

54599 **(CAPE—2868) SLAC 60kW sub-booster klystron and permanent magnet (Engineering Materials).** (Stanford Linear Accelerator Center, CA (USA)). 1983. Contract AC03-76SF00515. USDOE-TIC, PO Bx 62, Oak Ridge, TN 37830.

Portions are illegible in microfiche products10 35-mm aperture cards.

The drawings listed on the layout, outline drawing and auxiliary drawing list provide the data and specifications for constructing the SLAC 60 kW, 2.5 μs 720 pps Sub-booster Klystron as used on the accelerator to provide pulse drive power to 8 to 30 MW pulsed klystrons in that sector. When the klystron is driven with the proper pulse modulator extremely stable phase conditions are obtained.

54600 **(CAPE—2870) SLAC M TAC M SHAM Auxiliary Backplane No. 2 (Engineering Materials).** (Stanford Linear Accelerator Center, CA (USA)). 1980. Contract AC03-76SF00515. USDOE-TIC, PO Bx 62, Oak Ridge, TN 37830.

Microfiche only, copy does not permit paper copy reproduction 35-mm aperture cards.

The listed drawings provide the data and specifications for constructing an active high speed back plane. This device provides high speed emmiter-coupled logic (ECL) in a 4 layer printed circuit board. It fits a standard CAMAC crate and allows distribution of high speed data transmission to a maximum of 15 stations. It serves the purpose of making a CAMAC look like the newer Fastbus system. This device was used on the MK III detector system in the SLAC PEP storage ring.

54601 **(CAPE—2872) SLAC 200-kW Copper Sphere Beam Dump (100 kW actual): SA-901-061-01-R2 Subassembly; CK-082-783-00-R0 Auxiliary Drawing List (Engineering Materials).** (Stanford Linear Accelerator Center, CA (USA)). Oct 1971. Contract AC03-76SF00515. USDOE-TIC, PO Bx 62, Oak Ridge, TN 37830.

Portions are illegible in microfiche products0 35-mm aperture cards.

The subassembly drawing and the drawings listed thereon and on the Auxiliary Drawing List provide the data and specifications for constructing the SLAC 200 kW Copper Sphere Beam Dump. This beam dump while titled 200 kW is more like a 100 kW dump. Actual power absorbing capability is dependent upon the repitition rate, beam pulse length, current, and energy. SLAC Pub-555 by D.R. Walz and L.R. Lucas describes a 500 kW Beam Dump and requirements for it and lower beam powers.

54602 (CERN—83-02, pp 2-16) **FNAL plans for upgrading the fixed target experimental area to 1 TeV.** Stanfield, K.C. (Fermi National Accelerator Lab., Batavia, IL (USA)). 10 Feb 1983. NTIS (US Sales Only), PC A10/MF A01. (CONF-831216—Vol.1).

From Workshop on SPS fixed-target physics in the years 1984-1989; Geneva, Switzerland (6 Dec 1983).

The author describes the extracted beams at the Fermilab Tevatron. These are a prompt neutrino beam, a wide band photon beam, a muon beam, a high energy hadron beam, and a polarized proton beam.

54603 **(CONF-830384—2) High-sensitivity mass spectrometry with a tandem accelerator.** Henning, W. (Argonne National Lab., IL (USA); Technische Univ. Muenchen, Garching (Germany, F.R.). Fakultaet Physik). 1983. Contract W-31-109-ENG-38. 13p. NTIS, PC A02/MF A01. Order Number DE83017914.

From International symposium on nuclear physics at large tandem accelerators; Legnaro-Padova, Italy (15 Mar 1983).

Portions are illegible in microfiche products.

The characteristic features of accelerator mass spectrometry are discussed. A short overview is given of the current status of mass spectrometry with high-energy (MeV/nucleon) heavy-ion accelerators. Emphasis is placed on studies with tandem accelerators and on future mass spectrometry of heavier isotopes with the new generation of higher-voltage tandems.

54604 **(CONF-830911—Absts.) Scientific program and abstracts.** Gerich, C. (ed.). (Lawrence Livermore National Lab., CA (USA); Physics International Co., San Leandro, CA (USA)). 1983. Contract W-7405-ENG-48. 206p. NTIS, PC A10/MF A01. Order Number DE83017620.

From 5. international conference on high power particle beams; San Francisco, CA, USA (12 Sep 1983).

The Fifth International Conference on High-Power Particle Beams is organized jointly by the Lawrence Livermore National Laboratory and Physics International Company. As in the previous conferences in this series, the program includes the following topics: high-power, electron- and ion-beam acceleration and transport; diode physics; high-power particle beam interaction with plasmas and dense targets; particle beam fusion (inertial confinement); collective ion acceleration; particle beam heating of magnetically confined plasmas; and generation of microwave/free-electron lasers.

54605 **(DOE/SF/00515—T21) SLAC users bulletin No. 95, March-July 1983.** Keller, L.P.; Edminster, D. (eds.). (Stanford Linear Accelerator Center, CA (USA)). 1983. Contract AC03-76SF00515. 32p. NTIS, PC A03/MF A01. Order Number DE83017558.

Portions are illegible in microfiche products.

The report covers the following topics for the period from March through July 1983: program status and reports of experiments and tests; PEP activities including operating time and performance; SPEAR activities; VAX news; a tentative long range schedule to June, 1984; tables of approved experiments; a summary of accelerator and research operations hours; and decisions of the Experimental Program Advisory Committee. (GHT)

54606 **(IFVE-ORI—82-75) Calculation of muonic fields in the vicinity of high-energy proton accelerators.** Maslov, M.A.; Mokhov, N.V.; Uzunyan, A.V. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1982. 16p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702982.

Muon and hadron transport and their production from beam losses in the proton accelerator magnets are investigated. A method of statistical simulation, as it is realized in the RING program, has been developed. Muonic fields in the accelerating-storage complex and Tevatron soil shield are calculated for some model cases. An essential role of magnet elements and of prompt muons for the muonic field production has been stated. The radiation shield outside accelerator ring is shown to be defined completely by muons.

54607 (INS-NUMA—28, pp 78-85) **Ion source of the accelerator for heavy ion fusion.** Sakurada, Y. (Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study). Apr 1981. NTIS (US Sales Only), PC A07/MF A01. (CONF-8010330—).

From Symposium on inertial fusion with heavy ion beam; Tokyo, Japan (22 Oct 1980).

It has been estimated that the ion sources of linacs required for heavy ion fusion should produce the Xe ion beam of current up to 100 mA and good normalized emittance of about 0.02 cm-mrad. The production of the heavy ions of these current and emittance has been the goal of development of the heavy ion sources for fusion application. Regarding the heavy ion species, gaseous elements are handled conveniently in the ion sources, and the mass

should exceed 130, therefore Xenon gas is a promising candidate. The requirement for the ion sources used in fusion accelerators is different from that for the ion sources developed so far. It is to produce the ion beam of one kind with heavy mass, high intensity, single charge and good emittance. In the design of the ion sources for heavy ion fusion program, the efficiency of ion generation, beam intensity, emittance and the operation of long life must be taken in consideration. According to the study group on the ion sources for heavy ion fusion in USA, the ANL single aperture Penning source, the LBL/LLL type multi-aperture source, the duoplasmatron with a large plasma expansion cup and single or multiple aperture extraction, and the LBL contact ionization Cs(1+) source are promising for the purpose. The features of these sources are described and compared. The subjects to be studied in future are pointed out.

54608 **(INS-TH—141) Subsidiary FORTRAN subroutines at INS CAMAC system.** Ukai, K. (Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study). 16 Nov 1981. 38p. (In Japanese). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83703095.

The INS on-line system consists of the central computer, FACOM M-180II/AD, and the terminal ones, PANAFACOM U-400s. The data taking in the experiments are performed using the CAMAC system at the U-400. All programs of the on-line system including the CAMAC parts can be written by the FORTRAN language which was already explained elsewhere. But some parts of the programing of the CAMAC system need a bit pattern expression. These are the writing of the CAMAC control block (mainly Branch Driver control parameters), or the making of command words for read-, write-, or control-operations. These bit patterns are given by a DATA statement or a hexadecimal number. And the programs of these parts are a little bit difficult to write, to read, or to understand. Then subsidiary functions and subroutines are made in order to write easily a CAMAC control block and command words. This note explains how to use these functions and subroutines.

54609 **(INS-TH—143) Calibration of the energy indicator system of INS 1.3 GeV electron synchrotron.** Mutou, M.; Egawa, K.; Kasuya, K.; Ohshima, T.; Takeuchi, Y. (Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study). 25 Dec 1981. 16p. (In Japanese). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702985.

An indicator system for the accelerating energy of INS 1.3 GeV electron synchrotron has been calibrated. The system consists of a search coil mounted in the gap of the synchrotron magnet, a voltage-frequency convertor, a gate controller and a universal counter, and has worked continuously well. The indicated energy has been compared with one deduced from the measurement of bremsstrahlung photon spectrum from the internal target of the synchrotron. We have concluded that the indicator system is operated with a good precision of about +-0.3%.

54610 **(INS-TH—144) Noise reduction in the beam current monitor.** Arai, Shigeaki. (Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study). Feb 1982. 9p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702986.

A simple noise reduction system using a pulse transformer and a pair of L C low pass filters has been introduced to the beam current monitor of a current transformer type at the INS electron linac. With this system, the pick-up noise has been reduced to be 1% of the noise without noise reduction. Signal deformation caused by this system is relatively small and the beam current pulse down to 20 mA is successfully monitored in the actual accelerator operation.

54611 **(JINR—9-82-556) Dubna synchrophasotron. Operation and improvement (quarter 4, 1981).** Beznogikh, Yu.D.; Buldakovskij, V.N.; Vadeev, V.P. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1982. 4p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702991.

Information is presented on the accelerator operation in quarter 4, 1981 and during this year. To accelerate nuclei which are heavier than protons the electron-beam ion source KRION-1 was used. ^{12}C nuclei were accelerated. First ^{22}Ne nuclei were accelerated. The use of ^{22}Ne isotope allowed a pure beam of neon nuclei to be obtained at the output of the accelerator. The works on increasing the intensity in the channel of fast extraction are being continued. The studies have shown that the form of the magnet and the channel lens feed voltage should be changed. Results of geodezic control for the position of bench mark group are presented.

54612 **(JINR—9-82-623) Dubna synchrophasotron. Operation and improvement (quarter 1, 1982).** Voevodin, M.A.; Zabolotin, V.P.; Zinov'ev, L.P. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1982. 5p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702992.

Information is presented on the synchrophasotron operation in quarter 1, 1982, and on geodesic measurements. The measurements were performed by means of an induction magnitometer. Their purpose was to improve the efficiency of beam fast extraction.

54613 **(JINR-R—9-82-383) Three prototype units of a superconducting magnet system.** Shelaev, I.A.; Averichev, S.A.; Aksenov, V.G. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1982. 7p. (In Russian). (CONF-820546—15). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702993.

From 9. international cryogenic engineering conference; Kobe, Japan (10 May 1982).

Three prototypes of superconducting (SC) magnets have been designed, constructed and tested to investigate experimentally the SC magnet characteristics and bring a new process to a commercial level. Each period of 1.5 m length contains two SC beam-bending magnets, two quadrupole lenses, ultrahigh vacuum chamber, and horizontal helium cryostat. The data obtained under experiments make it possible to design as synchrotron with sufficiently large peak-to valley field ratio and acceleration cycle up to 2-4 s. Production of ultralow pressure in a cold vacuum chamber allows to accelerate not only the protons or nuclei of heavy elements, but also the low-charged heavy ions practically without losses on the account of charge exchange on a residual gas.

54614 (KEK—81-2, pp 62-69) **Project of aluminium ducts for pulsed beam stretcher.** Konno, O.; Sasanuma, T. (Tohoku Univ., Sendai (Japan). Lab. of Nuclear Science). Apr 1981. (In Japanese). NTIS (US Sales Only), PC A07/MF A01. (CONF-800194—).

From 3. meeting on ultra high vacuum techniques for accelerators and storage rings; Oho, Ibaraki, Japan (24 Jan 1980).

The project of aluminium ducts for the pulsed beam stretcher is in progress. The designed stretcher accepts the pulsed electron beam of about 150 MeV from an electron linear accelerator. The beam from the stretcher is continuous current beam of 3 microampere. The aluminium ducts are designed to reduce the residual radioactivity of ducts. The strength of flanges may be increased by hardening by the CrN treatment. The cooling parts of ducts must be minimum. The joining of aluminium parts and SUS parts won't be made. The required vacuum of the beam ducts is 10^{-6} Torr. The irradiation test of the beam ducts by electron beam was performed. The temperature of the ducts after irradiation was 30 degree C, and the vacuum was 5×10^{-6} Torr. When the Al flanges were irradiated for 30 sec, the vacuum became worse. Cooling pipes are necessary for the parts under strong irradiation. The residual activity on the surface decayed rapidly after the irradiation.

54615 (KEK—81-2, pp 90-94) **Vacuum system of tandem type electrostatic accelerator of Kyushu University.** Nakajima, Y. (Kyushu Univ., Fukuoka (Japan). Faculty of Science). Apr 1981. (In Japanese). NTIS (US Sales Only), PC A07/MF A01. (CONF-800194—).

From 3. meeting on ultra high vacuum techniques for accelerators and storage rings; Oho, Ibaraki, Japan (24 Jan 1980).

In the tandem type electrostatic accelerator of Kyushu University, the problem of vacuum in the beam transport system including the accelerator tube has been considered as one of the important elements for the performance of the electrostatic accelerator from the beginning of construction. Though the three-stage

tandem accelerating scheme was considered as the beam transport system at the beginning of the program, in which the existing 6 MV Van de Graaf accelerator was to be used as the injector, three types of ion sources are prepared at present; the sputter ion source to generate negative heavy ions, the polarizing ion source to generate negative polarized protons or deuterons, and direct extraction type negative ion source. Ultrahigh evacuating system, in which the sputter ion pump is mainly employed, and the turbo-molecular pump is used supplementarily, was installed in the vacuum system. The vacuum of approximately 10^{-9} Torr level off-beam at the inlet or outlet of the accelerator tube and approximately 10^{-8} Torr level in the tubing section in the center terminal were achieved. Since the upper limit of withstand voltage of the accelerating tube was not able to be satisfied for the insufficient baking at the beginning, it was finally decided that the accelerating tube should be heated by directly supplying power to the electrode through low voltage discharge in the tube. This method enabled the generated voltage at the terminal to exceed 10 MV.

54616 **(KEK—81-13) Study on low energy intense kaon beam.** Yamamoto, A. (National Lab. for High Energy Physics, Oho, Ibaraki (Japan)). Nov 1981. 206p. NTIS (US Sales Only), PC A10/MF A01. Order Number DE83702998.

The design and construction of the low energy kaon beam K2 are described. The K2 beam covers the momentum region of 1 - 2 GeV/c and has the solid angle momentum acceptance of 6.25 msr.%Δp/p. Beam intensities of 5 x 10^5 K^+ and 1 x 10^5 K^- were measured at the beam momentum of 2.1 GeV/c for 10^{12} 12 GeV primary protons incident on a 6 mm dia. and 60 mm long platinum target. The ratio of π^+/K^+ was measured to be 2 at the beam momentum of 1.6 GeV/c. Secondary particle production cross sections at zero degree production from 12 GeV primary protons incident on nuclear targets were measured at the K2 beam and these results are presented. The results of the analysis suggest that invariant cross sections for the production of π^{+-}, K^{+-}, p and anti p in p-Be interactions at P sub(t) = 0 can be expressed as a function of the scaling variable x = E^*/E_o * where E^* is the energy of the secondary particle and E_o * is the maximum energy kinematically available for the secondary particle of interest in the center-of-mass system. An empirical formula is proposed to predict the secondary particle production from p-Be interaction. Finally the optimization of kaon production at the low energy kaon beam and possibility of a very low energy kaon beam using superconducting magnets are discussed for future developments.

54617 **(KEK—81-17) Beryllium window for synchrotron radiation.** Nagakura, I. (National Lab. for High Energy Physics, Oho, Ibaraki (Japan)). Jan 1982. 52p. (In Japanese). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83703001.

For the experiments using synchrotron radiation in atmospheric environment, such as x-ray diffraction, a window which should isolate the high vacuum beam channel from the atmosphere is required. This report presents the several calculations on characteristics of beryllium plates which will be applied to the windows for some x-ray beam channels of the electron storage ring under construction at National Laboratory for High Energy Physics (KEK-PF). Calculations are made on intensity distributions of x-rays, thermal stresses and mechanical stresses in the beryllium plates with various thicknesses. Practical dimensions of beryllium plates for x-ray windows are determined according to experimental conditions.

54618 **(KEK—81-20) Calculation on longitudinal instability due to RF cavities.** Chin, Y. (National Lab. for High Energy Physics, Oho, Ibaraki (Japan)). Mar 1982. 29p. (CONF-800194—). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83703003.

From 3. meeting on ultra high vacuum techniques for accelerators and storage rings; Oho, Ibaraki, Japan (24 Jan 1980).

The randomness of higher mode frequencies of RF cavities due to the construction errors leads to the statistical spread of the tune shifts and growth rates of coherent oscillations in large storage rings. This paper discusses a statistical approach to the calculation of the longitudinal instability due to RF cavities for a bunched electron beam. The Monte Carlo simulation in the frequency domain is used to calculate the mean and rms spread of the complex tune shifts due to randomly distributed higher mode impedances. The Gaussian bunch model of Zotter is used with his analytic summation of the infinite series. Numerical application is shown for the TRISTAN electron-positron ring. Both contributions of the accelerating mode and the higher modes of the cavity are considered. It is found that some modes may cause beam instabilities at low energies by large contributions of the higher mode impedances.

54619 **(LBL—15122) Low-noise gallium-arsenide field-effect transistor preamplifiers for stochastic beam-cooling systems.** Leskovar, B.; Lo, C.C. (Lawrence Berkeley Lab., CA (USA)). Mar 1983. Contract AC03-76SF00098. 6p. (CONF-830311—188). NTIS, PC A02/MF A01. Order Number DE83017535.

From Particle accelerator conference; Santa Fe, NM, USA (21 Mar 1983).

The present noise performance, bandwidth capability and gain stability of bipolar and field-effect transistors, parametric amplifier, Schottky diode mixer and maser are summarized and compared in the 100 MHz to 40 GHz frequency range for stochastic beam cooling systems. Stability factor of GaAs FET's as a function of ambient temperature is presented and discussed. Performance data of several low-noise wide-band cryogenically cooled preamplifiers are presented including one with a noise figure of 0.35 dB over a bandwidth range of 150 to 500 MHz operating at ambient temperature of 20°K. Also, data are given on a broadband 1 to 2 GHz preamplifier having a noise figure of approximately 0.2 dB. The gain, operating noise temperature, stability, gain nonuniformity and phase-shift as function of frequency of interest for beam cooling systems are discussed.

54620 **(LBL—15991) 344 cm x 86 cm low mass vacuum window.** Reimers, R.M.; Porter, J.; Meneghetti, J.; Wilde, S.; Miller, R. (Lawrence Berkeley Lab., CA (USA)). Aug 1983. Contract AC03-76SF00098. 6p. (CONF-830822—22). NTIS, PC A02/MF A01. Order Number DE83017521.

From 12. international conference on high energy accelerators; Batavia, IL, USA (11 Aug 1983).

Portions are illegible in microfiche products.

The LBL Heavy Ion Spectrometer System (HISS) superconducting magnet contains a 1 m x 3.45 m x 2 m vacuum tank in its gap. A full aperture thin window was needed to minimize background as the products of nuclear collisions move from upstream targets to downstream detectors. Six windows were built and tested in the development process. The final window's unsupported area is $3m^2$ with a 25 cm inward deflection. The design consists of a .11 mm Nylon/aluminum/polypropylene laminate as a gas seal and .55 mm woven aramid fiber for strength. Total mass is 80 milligrams per cm^2. Development depended heavily on past experience and testing. Safety considerations are discussed.

54621 **(LBL—16003) Characteristic time structure in slow resonant extracted beam.** Crebbin, K.C. (Lawrence Berkeley Lab., CA (USA)). Aug 1983. Contract AC03-76SF00098. 6p. (CONF-830822—21). NTIS, PC A02/MF A01. Order Number DE83017519.

From 12. international conference on high energy accelerators; Batavia, IL, USA (11 Aug 1983).

The phase diagram for resonant extraction is normally shown as a sharp line, passing through the unstable fixed point, dividing the stable region from the unstable region. This line is a sharp boundary line in the limiting mathematical case where the particle passes through all points on the line. In the physical case, a specific particle occupies only a limited number of phase points along the line. As a result, the line becomes a band of finite width containing a number of regions of stability and instability. The width of this band and the time structure extracted from this band is related to the tune shift and shape of the perturbation used in the extraction system. This paper discusses the physical reasons for this effect and presents computer calculations showing the time structure for the NU equals two-thirds extraction system in the Bevalac. Photomultiplier pictures of beam structure taken before and after recent changes in the perturbation magnet show similar changes in time structure corresponding to changes in operating values of the NU shift used for extraction.

54622 (NIIEFA-P-B—0527) To the choice of a konfiguration of electromagnet magnetic circuit elements. Suvorov, M.M.; Shmal'ko, G.I. (Nauchno-Issledovatel'skij Inst. Ehlektrofizicheskoj Apparatury, Leningrad (USSR)). 1981. 12p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703008.

For the purpose of solving the problem on minimization of scattering flux passing through the electromagnet operating region, the electromagnet with a magnetic circuit and superconducting excitation winding is considered. The electromagnet is intended for operation at charged particle beam lines. The magnet has a magnetic circuit in the air gap of which there is an operating region of some cubic metres volume. The configuration of magnetic circuit separate elements effect on electromagnetic parameters is investigated. The electromagnet operating region dimensions are: interpolar gap - 1 m, diameter - 2 m, centre field - 2-4 Tl. The pole shape, support and girder position vary. The investigation results have shown that the pole should have smooth configuration, the magnetic ciucuit support should be located sufficiently far from the excitation winding the gap between the magnetic circuit girder and the coil should be minimum.

54623 (TU-Inf—05-37-80) Determination of the secondary radiation field of the Dubna synchrocyclotron. Streubel, G.; Doerschel, B. (Technische Univ., Dresden (German Democratic Republic). Sektion Physik). 1980. 16p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703445.

For neutron spectra and neutron fluence measurements activation probes and solid-state track detectors have been positioned in the secondary radiation field of the Dubna synchrocyclotron near the target and in front of and behind a shield made of heavy concrete. The values of fluences are compared with those obtained from integrating calculated neutron spectra and those measured with a moderating sphere detector additionally fitted with activation probes. The results have been used for drawing conclusions with regard to radiation protection tasks at high-energy accelerators.

54624 (ZfK—490) 10 years Rossendorf Tandem. Weibrecht, R. (ed.). (Zentralinstitut fuer Kernforschung, Rossendorf bei Dresden (German Democratic Republic)). Dec 1982. 107p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83703446.

10 years of successful operation of the Rossendorf Tandem is an occasion to give an account about the most important developments and results in the fields of accelerator technology and utilization of this machine. The selected and sum contributions reflect the systematic orientation on increasing the availability of the accelerator as well as its improvement to an effective heavy ion accelerator to extend the quantitative and qualitative possibilities of application in nuclear physical experiments.

54625 Conceptual design of a permanent quadrupole magnet with adjustable strength. Halbach, K. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.). *Nuclear Instruments and Methods in Physics Research;* **206**: No. 3, 353-354(1 Mar 1983).

The conceptual design of a quadrupole magnet is described that uses both permanent magnet material and soft iron. The quadrupole gradient can be adjusted without affecting the field distribution, and the basic design principle can be used to build dipole and other multipole magnets.

54626 Variable aperture neutron collimator. Hill, R.A. (Sandia National Labs., Albuquerque, NM (USA)). *Nuclear Instruments and Methods in Physics Research;* **206**: No. 3, 537-540(1 Mar 1983).

We describe a completely adjustable, variable aperture neutron collimator that provides uniform shielding outside the aperture. This aperture can be adjusted smoothly from a square-to-rectangular cross section while maintaining either a uniform or diverging channel.

54627 Transverse quadrupole wake field effects in high intensity linacs. Chao, A.W. (Stanford Linear Accelerator Center, CA); Cooper, R.K. *Particle Accelerators;* **13**: No. 1-2, 1-12(1983). Contract AC03-76SF00515.

Transverse quadrupole wake fields exist whenever the beam is not round, and therefore in an alternating-gradient focusing system these fields cannot be eliminated. As a result, these fields represent a potential limitation on high-intensity linac performance. In this note we calculate the magnitude of quadrupole wake field effects for the SLAC linac.

54628 Stabilized radio-frequency quadrupole. Lancaster, H.D.; Fugitt, J.A.; Howard, D.R. US Patent Application 6-426,363. 29 Sep 1982. 13p. Contract AC03-76SF00098.

A long-vane stabilized radio frequency resonator for accelerating charged particles and including means defining a radio frequency resonator cavity, a plurality of long vanes mounted in the defining means for dividing the cavity into sections, and means interconnecting opposing ones of the plurality of vanes for stabilizing the resonator.

54629 Permanent-magnet multipole with adjustable strength. Halbach, K. US Patent Application 6-420,433. 20 Sep 1982. 18p. Contract AC03-76SF00098.

Two or more magnetically soft pole pieces are symmetrically positioned along a longitudinal axis to provide a magnetic field within a space defined by the pole pieces. Two or more permanent magnets are mounted to an external magnetically-soft cylindrical sleeve which rotates to bring the permanent magnets into closer coupling with the pole pieces and thereby adjustably control the field strength of the magnetic field produced in the space defined by the pole pieces. The permanent magnets are preferably formed of rare earth cobalt (REC) material which has a high remanent magnetic field and a strong coercive force. The pole pieces and the permanent magnets have corresponding cylindrical surfaces which are positionable with respect to each other to vary the coupling there between. Auxiliary permanent magnets are provided between the pole pieces to provide additional magnetic flux to the magnetic field without saturating the pole pieces.

54630 Production of slow positrons beams with an electron linac. Howell, R.H.; Alvarez, R.A.; Stanek, M. (Lawrence Livermore National Lab., CA (USA)). pp 860-862 of Positron annihilation. Proceedings of the sixth international conference held at The University of Texas at Arlington, April 3-7, 1982. Coleman, P.G.; Sharma, S.C.; Diana, L.M. (Texas Univ., Arlington (USA). Center for Positron Studies) (eds.). Amsterdam, Netherlands; North-Holland (1982). (CONF-820434—).

From 6. international conference on positron annihilation; Arlington, TX, USA (3 Apr 1982).

Intense, pulsed beams of low-energy positrons have been produced by a high-energy beam from an electron linac. The production efficiency for low-energy positrons has been determined for electrons with 60 to 120 MeV energy. Low-energy positron beams from a linac can be of much higher intensity than those beams currently derived from radioactive sources.

4304 Storage Rings

REFER ALSO TO CITATION(S) 54473

54631 (BNL—32362) Spectrometer coupled to an electron storage ring for tagging laser backscattered gamma rays. Thorn, C.E.; LeVine, M.J.; Sandorfi, A.M. (Brookhaven National Lab., Upton, NY (USA)). 1982. Contract AC02-76CH00016. 5p. (CONF-8210115—9). NTIS, PC A02/MF A01. Order Number DE83017751.

From Workshop on the use of electron rings for nuclear physics research; Lund, Sweden (5 Oct 1982).

A spectrometer has been designed to momentum analyze electrons, from the 2.5 to 3.0 GeV x-ray storage ring of the National Synchrotron Light Source at Brookhaven National Laboratory, that have lost energy from the production of high energy γ-rays by

Compton scattering of laser light. The electrons detected in the focal plane will provide a tag for the backscattered γ-rays, determining their energy (to 2.3 MeV), and timing. This design utilizes the fact that, due to kinematics, the Compton scattered electrons have a transverse phase space negligibly different from that of the stored beam. It is constrained by the requirement of not altering any of the existing elements of the storage ring. In particular, no structures or fields interfere with the large aperture of the storage ring that is required for loading the ring.

54632 **(BNL—33487) Magnetic field measurements of superconducting magnets for the colliding beam accelerator.** Herrera, J.; Kirk, H.; Prodell, A.; Willen, E. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 7p. (CONF-830822—20). NTIS, PC A02/MF A01. Order Number DE83017351.

From 12. international conference on high energy accelerators; Batavia, IL, USA (11 Aug 1983).

Portions are illegible in microfiche products.

An important aspect of the development and production of superconducting magnets for the Colliding Beam Accelerator is the measurement of the magnetic field in the aperture of these magnets. The measurements have the three-fold purpose of determining the field quality as compared to the lattice requirements of the CBA, of obtaining the survey data necessary to position the magnets in the CBA tunnel, and lastly, of characterizing the magnetic fields for use in initial and future orbit studies of the CBA proton beams. Since for a superconducting storage accelerator it is necessary to carry out these detailed measurements on many (~ 1000) magnets and at many current values (~ 1000), we have chosen, in agreement with previous experience, to develop a system which Fourier analyses the voltages induced in a number of rotating windings and thereby obtains the multipole field components. The important point is that such a measuring system can be fast and precise. It has been used for horizontal measurements of the CBA ring dipoles.

54633 **(BNL—33591) Helium-flow measurement using ultrasonic technique.** Sondericker, J.H. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 8p. (CONF-830841—16). NTIS, PC A02/MF A01. Order Number DE83017765.

From Cryogenic engineering conference and international cryogenic materials conference; Colorado Springs, CO, USA (15 Aug 1983).

While designing cryogenic instrumentation for the Colliding Beam Accelerator (CBA) helium-distribution system it became clear that accurate measurement of mass flow of helium which varied in temperature from room to sub-cooled conditions would be difficult. Conventional venturi flow meters full scale differential pressure signal would decrease by more than an order of magnitude during cooldown causing unacceptable error at operating temperature. At sub-cooled temperatures, helium would be pumped around cooling loops by an efficient, low head pressure circulating compressor. Additional pressure drop meant more pump work was necessary to compress the fluid resulting in a higher outlet temperature. The ideal mass flowmeter for this application was one which did not add pressure drop to the system, functioned over the entire temperature range, has high resolution and delivers accurate mass flow measurement data. Ultrasonic flow measurement techniques used successfully by the process industry, seemed to meet all the necessary requirements. An extensive search for a supplier of such a device found that none of the commercial stock flowmeters were adaptable to cryogenic service so the development of the instrument was undertaken by the CBA Cryogenic Control and Instrumentation Engineering Group at BNL.

54634 **(BNL—33651) Problem of magnet ramping.** Bozoki, E.S. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 5p. (CONF-8309144—2). NTIS, PC A02/MF A01. Order Number DE83014054.

From EPS conference on computing in accelerator design and operation; Berlin, F.R. Germany (20 Sep 1983).

In the accelerator rings, the momentum of the beam is being changed. It is necessary to ramp (up or down) all magnets in the ring in perfect synchronism and precisely according to a desired ramping function to prevent beam losses or unwanted changes in the beam characteristics (e.g., tune or chromaticity). The ramping function is discussed along with its implementation in a microprocessor controlled function generator. 4 references.

54635 **(CAPE—2869) SLAC analog status monitor Mod II (Engineering Materials).** (Stanford Linear Accelerator Center, CA (USA)). 1977. Contract AC03-76SF00515. USDOE-TIC, PO Bx 62, Oak Ridge, TN 37830.

Portions are illegible in microfiche products0 35-mm aperture cards.

The drawings listed on the drawing list provide the data and specifications for constructing a SLAC type of Analog Status Monitor. This device provides a single set point monitor of an analog level which will give an alarm when the analog goes over or under the set point whichever is chosen or set up. Uses at SLAC were to detect power supply failures along with other types of equipment malfunctions. It is used on the SPEAR and PEP storage rings.

54636 **(CAPE—2873) SLAC trigger distribution detector/transmitter: DL-208-503-00-R1 Drawing List (Engineering Materials).** (Stanford Linear Accelerator Center, CA (USA)). Jul 1980. Contract AC03-76SF00515. USDOE-TIC, PO Bx 62, Oak Ridge, TN 37830.

Portions are illegible in microfiche products5 35-mm aperture cards.

The drawing list and the drawings listed thereon provide the data and specifications for constructing the SLAC PEP Storage Ring. The device detects the trigger going around the ring, amplifies, and retransmits it to the next area. There is one or more of these units in each of the six regions of PEP. Outputs for various triggering functions are provided on each device.

54637 (INS-NUMA—28, pp 93-111) **Coherent instability of the heavy ion beam in the storage ring.** Noda, A. (Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study). Apr 1981. NTIS (US Sales Only), PC A07/MF A01. (CONF-8010330—).

From Symposium on inertial fusion with heavy ion beam; Tokyo, Japan (22 Oct 1980).

The storage ring as the final part of a driver for heavy ion fusion is required to provide heavy ions (A asymptotically equals 200) with energy of 5 -- 10 GeV and such a high intensity as 1 -- 6 x 10^{15} ions/pulse. So as to raise the number of ions which can be accumulated in a ring, singlly charged heavy ion is used for its relatively smaller incoherent space charge force compared with higher charge states. The intensity limit due to incoherent space charge force is 0.7 -- 1.4 x 10^{15} ions for U^{1+}. Much more severe limits exist due to coherent motion of heavy ion beams (0.8 -- 2 x 10^{13} for longitudinal motion and 0.9 -- 1.1 x 10^{12} for transverse motion), because of the relatively lower velocity of the accumulated ions. It seems unrealistic to use a lot of rings in order to operate below such intensity limits of the above instability. Therefore the number of the storage rings is constrained within a reasonable value (3 -- 7) and the possibility of compressing the bunches of heavy ion beams before the instability grows fatally large is studied.

54638 (INS-NUMA—28, pp 58-67) **Beam loss in accumulation ring due to charge transfer and ionization processes.** Tokuda, N. (Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study). Apr 1981. NTIS (US Sales Only), PC A07/MF A01. (CONF-8010330—).

From Symposium on inertial fusion with heavy ion beam; Tokyo, Japan (22 Oct 1980).

In the process of accumulating intense ion beam in a storage ring, the beam loss due to charge transfer process may be a severe problem: the one is the transfer between a beam ion and a residual gas molecule, and the other is that between beam ions. The loss rate was calculated for the case of a storage ring for heavy ion fusion, where $^{238}U^{+}$ ions are accumulated. For beam-residual gas interaction, the velocity of a 5 GeV uranium ion is 20.8% of light velocity. The experimental data for the charge transfer process in this energy region are poor, so theoretically estimated value was adopted. If it is assumed that residual gas is nitrogen, the loss rate is 4.6 x 10^{10} P(s^{-1}), where P is the pressure in a ring in Torr. To attain e-fold life time, the pressure should be reduced to 2.2 x 10^{-11} Torr, and it is not very difficult to attain such vacuum. As beam

ions circulate in a ring with betatron oscillation, they collide to each other. In the case of U^+, through the theoretical estimation and experimental data, the loss rate is 5.49/s and the life time is 0.182 s. With this life time, about 20% of the accumulated ions are lost during the stacking process of 40 ms. As shown above, the beam loss due to charge transfer process cannot be neglected, and it must be taken into consideration in designing a storage ring of intense heavy ion beam.

54639 (INS-NUMA—28, pp 68-77) **Outline of heavy ion beam accelerator for inertial confinement fusion.** Katayama, T. (Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study). Apr 1981. NTIS (US Sales Only), PC A07/MF A01. (CONF-8010330—).

From Symposium on inertial fusion with heavy ion beam; Tokyo, Japan (22 Oct 1980).

Heavy ion inertial fusion program has become more promising through the intense works on high energy, heavy ion accelerators during past four years. The heavy ion method is superior to the methods with other particle beam, because the peak current requirement is reduced drastically to several kA. The driver efficiency is expected to be 20% or more in the heavy ion method, and the absorption efficiency in the pellets is three times as high as that of laser fusion method. In Japan, Institute of Plasma Physics of Nagoya University and Institute of Laser Engineering of Osaka University participate mainly in the design of reactor and pellet systems, while National Laboratory for High Energy Physics and Institute for Nuclear Study of University of Tokyo have studied on heavy ion accelerators. In this paper, the outline of the accelerator system is described on the basis of the typical parameters of pellet design. The determination of beam parameters, the beam lines in reactors, current multiplication, the main parameters of the storage ring, the ion source and the linear accelerator are explained. In the present design concept, an RFQ linac is proposed in low velocity region. The focus action is independent of the beam velocity, and it has the capture efficiency as high as about 90%.

54640 (KEK—81-2, pp 57-61) **Present status of the vacuum system of the electron storage ring.** Kobayashi, M. (National Lab. for High Energy Physics, Oho, Ibaraki (Japan)). Apr 1981. (In Japanese). NTIS (US Sales Only), PC A07/MF A01. (CONF-800194—).

From 3. meeting on ultra high vacuum techniques for accelerators and storage rings; Oho, Ibaraki, Japan (24 Jan 1980).

The electron storage ring at KEK requires the ultrahigh vacuum such as 10^{-11} Torr in no electron storage and 10^{-9} Torr in electron storage. The storage ring consists of deflecting magnets, quadrupole magnets, vacuum ducts and pumping systems. The vacuum ducts consists of deflecting magnet ducts (B type ducts), quadrupole magnet ducts (Q type ducts) and linear ducts (0 type ducts). The B ducts are made of Al alloy (Al 6063-Tl), the flanges are made of SUS 304L stainless steel, and the bellows are made of SUS 316L stainless steel. The Q type ducts are made of Al alloy (Al 6063-T3) and SUS stainless steel. The linear ducts are made of SUS 304L. The main pumping systems of the storage ring are ion pumps. The effective pumping rate of pumps is about 77 l/s. The distributed ion pumps in the B type ducts attained the pumping rate of 190 l/s. Ti getters are provided. The design of rough pumping systems is in progress.

54641 (KEK—81-2, pp 70-84) **Vacuum system of TRISTAN electron ring.** Ishimaru, H.; Narushima, K.; Nakanishi, H.; Horikoshi, G. (National Lab. for High Energy Physics, Oho, Ibaraki (Japan)). Apr 1981. (In Japanese). NTIS (US Sales Only), PC A07/MF A01. (CONF-800194—).

From 3. meeting on ultra high vacuum techniques for accelerators and storage rings; Oho, Ibaraki, Japan (24 Jan 1980).

The conceptual design and developing studies of the vacuum system in the 30 GeV electron/positron collision ring which belongs to the phase I of TRISTAN program have been continued so far. In June, 1980, the conceptual design for the phase I has become concrete, which included the 6 to 8 GeV accumulator ring having the 2.5 GeV electron linac in the radiated light experiment facility now under construction as the injector, and the 30 GeV super-large TRISTAN ring. The pressure required is on the average 5×10^{-9} Torr if beam life is assumed as 48 hours. The main pump for the beam duct is the distributed ion pump. The beam duct is made of aluminum alloy, and composed of pump room, cooling channels and heater groove and others. In the beam duct, the standardized deflection magnet section, quadrupole magnet section, straight run portion, etc. are jointed by full automatic welding with the bellows having the same cross-sectional shape without using flanges. This satisfies the requirements of high reliability, sharp cut of cost, smaller space factor, beam impedance matching, reduction of residual radioactivity, and simplification and light weight. The auxiliary ion pump is provided to maintain the ultrahigh vacuum even during the interruption of operation. Further, roughing pump, gate valve, heater and heat insulation, vacuum gauge, monitor, collision experiment section, septum magnet chamber for beam injection and extraction, electron/positron separater chamber, radiated light channel are described, respectively.

54642 (KEK—81-2, pp 85-89) **Operating status of TARN vacuum system and future tasks.** Chida, K.; Tsujikawa, H.; Mizobuchi, A. (Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study). Apr 1981. (In Japanese). NTIS (US Sales Only), PC A07/MF A01. (CONF-800194—).

From 3. meeting on ultra high vacuum techniques for accelerators and storage rings; Oho, Ibaraki, Japan (24 Jan 1980).

TARN (Test Accumulation Ring for Numatron) was constructed for the purpose of obtaining the fundamental data for high energy heavy ion accelerator (Numatron) project, which accelerates heavy ions up to uranium to 1 GeV/nucleon. Its vacuum is required to be 1×10^{-10} Torr or less on beam. In February, 1972, only the vacuum system was temporarily assembled, and the vacuum of 2×10^{-11} Torr was realized by baking at 300 deg C alone. In July, 1972, the assembling of the vacuum chamber into magnets was completed, and several test experiments were performed using the H_3^+ beam from the SF cyclotron. In this report, first, the outline of the vacuum system, and next, its operation are described. For the reason of the purpose of the ring, the vacuum system is required to be atmospheric pressure to attach beam monitors and other measuring instruments just before the machine time. Therefore, it is an important task to make the evacuation time as short as possible. As future tasks, the examination on the material and shape of the chamber, the investigation of pump system (appropriate combination of ion pump, titanium sublimation pump, cryopump, molecular pump, etc.), the study on the measuring and control systems (accurate measurement of total pressure and partial pressure and the feedback to the protecting system), the studies of problems on the vacuum wall surface (surface treatment prior to assembling the chamber into the ring and the methods and the effects of baking and electric discharge cleaning) are included.

54643 (KEK—81-7) **Alternative longitudinal polarization scheme for tristan.** Chao, A.W.; Yokoya, K. (National Lab. for High Energy Physics, Oho, Ibaraki (Japan)). Jul 1981. 13p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703005.

For electron storage rings general conditions are derived to get a high level longitudinal polarization and a possible design of the experimental insertion for TRISTAN e-p collider is presented.

54644 (KEK—81-10) **Computer simulation of the heating effect on mirrors by synchrotron radiation.** Ohta, T.; Fujikawa, T. (National Lab. for High Energy Physics, Oho, Ibaraki (Japan)). Aug 1981. 24p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702996.

Heat load and temperature distribution of a mirror due to the synchrotron radiation was calculated for the case of 2.5 GeV Photon Factory storage ring. The effect of mirror reflection and photoelectron ejection on the heat load was taken into account for various incident angles of the radiation beam. Thermal distortion of a mirror, caused by the local temperature difference was also calculated. It turned out that the thermal distortion of copper or SiC mirror is rather small, but that of a quartz mirror is larger by one order of magnitude and not negligible, even when we cool the bottom side of the mirror.

44 INSTRUMENTATION

4401 Radiation Instrumentation

REFER ALSO TO CITATION(S) 53628, 54600, 54900, 55123, 55124, 55127, 55137, 55214, 55334

54645 (AD-A—128190/6) **Cadmium telluride detectors for gamma dose-rate meters.** McGowan, S. (Defence Research Establishment, Ottawa, Ontario (Canada)). Mar 1982. 28p. (DREO—859). NTIS, PC A03/MF A01.

The response of a 0.25-mm CdTe detector has been calculated for photon energies ranging from 0.06 to 5.0 MeV using the computer code CYLTRAN. Results show that the response is highly energy dependent, varying by almost three decades over this energy range. The response also depends significantly on the amount of scattering material adjacent to the detector. Some additional calculations show that the response can be made more uniform by using a lead/tin filter and by employing more than one energy-discrimination level, but good uniformity of response is difficult to achieve. At 2 MeV a response of 2.1 x 10.7 counts/(mm squared gray) was found which is essentially the same as for silicon of equivalent thickness. Measurements with a commercial CdTe detector confirmed the results of the calculations, although comparison of measured and calculated results indicated that the detector was not as thick as its specified 0.25 mm.

54646 (ANL-HEP-CP—82-24, pp 131-149) **Status of the HPW nucleon decay detector.** Gaidos, J.A. (Purdue Univ., Lafayette, IN). 1982. NTIS, PC A21/MF A01. (CONF-8206123—).

From Workshop on proton decay experiments; Argonne, IL, USA (7 Jun 1982).

The HPW (Harvard-Purdue-Wisconsin) water Cherenkov detector for the nucleon decay experiment is currently operating in a deep underground mine in Utah. A brief outline of present activities is given.

54647 (ANL-HEP-CP—82-24, pp 150-168) **Homestake tracking spectrometer: a one-mile deep 1400-ton liquid scintillation nucleon decay detector.** Cherry, M.L. (Univ. of Pennsylvania, Philadelphia); Davidson, I.; Lande, K.; Lee, C.K.; Marshall, E.; Steinberg, R.I.; Cleveland, B.; Davis, R. Jr.; Lowenstein, D. 1982. NTIS, PC A21/MF A01. (CONF-8206123—). Contract AC02-81ER40012.

From Workshop on proton decay experiments; Argonne, IL, USA (7 Jun 1982).

We describe a proposed nucleon decay detector able to demonstrate the existence of nucleon decay for lifetimes up to 5 x 10^{32} yr. The proposed instrument is a self-vetoed completely-active 1400-ton liquid scintillation Tracking Spectrometer to be located in the Homestake Mine at a depth of 4200 mwe, where the cosmic ray muon flux is only 1100/m^2/yr, more than 10^7 times lower than the flux at the earth's surface. Based on computer simulations and laboratory measurements, the Tracking Spectrometer will have a spatial resolution of +- 15 cm (0.32 radiation lengths); energy resolution of +- 4.2%; and time resolution of +- 1.3 ns. Because liquid scintillator responds to total ionization energy, all neutrinoless nucleon decay modes will produce a sharp (+- 4.2%) total energy peak at approximately 938 MeV, thereby allowing clear separation of nucleon decay events from atmospheric neutrino and other backgrounds. The instrument will be about equally sensitive to most nucleon decay modes. It will be able to identify most of the likely decay modes (including n -> nu + K/sub s/^{0} as suggested by supersymmetric grand unified theories), as well as determine the charge of lepton secondaries and the polarization of secondary muons.

54648 (ANL-HEP-CP—82-24, pp 191-202) **Design study for a fine-grained multi-kiloton detector for nucleon decay and neutrino studies.** Beier, E.W. (Univ. of Pennsylvania, Philadelphia). 1982. NTIS, PC A21/MF A01. (CONF-8206123—). Contract AC02-76ER03071.

From Workshop on proton decay experiments; Argonne, IL, USA (7 Jun 1982).

Experiments which attempt to measure the lifetimes of protons and bound neutrons require detectors which have 10^{33} or more fiducial nucleons. If an experiment is to be sensitive to all, or most of the kinematically allowed decay modes, it must also have many samples of information from the nucleon decay products, that is, it must be fine-grained. This report describes a design study for such an experiment carried out at the University of Pennsylvania by E.W. Beier, L.S. Durkin, S.M. Heagy, A.K. Mann and H.H. Williams. The performance of a 160 ton prototype of the nucleon decay detector is also discussed. The detector is based on large, segmented planes of liquid scintillator calorimeter (8m x 8m) viewed by photomultiplier tubes, interleaved with track chambers operated in the proportional mode.

54649 (ANL-HEP-CP—82-24, pp 203-223) **Review of the status of proton decay experiments outside the USA.** Grant, A.L. (CERN, Geneva, Switzerland). 1982. NTIS, PC A21/MF A01. (CONF-8206123—).

From Workshop on proton decay experiments; Argonne, IL, USA (7 Jun 1982).

The status of the three European calorimetric tracking detectors and the Japanese water Cherenkov detector is reviewed. In particular the performance of the detectors is reconsidered in the light of the new theoretical predictions of decay modes from supersymmetric unified theories.

54650 (ANL-HEP-CP—82-24, pp 224-256) **Prospects for very large, sensitive water Cherenkov detectors for proton decay and neutrino oscillations search.** Cline, D.B. (Univ. of Wisconsin, Madison). 1982. NTIS, PC A21/MF A01. (CONF-8206123—).

From Workshop on proton decay experiments; Argonne, IL, USA (7 Jun 1982).

We discuss the possibility of constructing large water Cherenkov detectors with mass 10^5 to 10^6 tons that would be sensitive to a few hundred MeV - few GeV energy release. The 10^5 ton detector would be suitable for a search for certain proton decay modes whereas the 10^6 ton detector would act as an active shield for the proton decay detector and as a nu/sub e/, nu/sub μ/ and possibly nu/sub tau/ interaction detector. The neutrino physics would include a sensitive search for neutrino oscillations using atmospheric neutrinos. The location of this detector could be in the deep ocean near Hawaii or in a deep trench between Cuba and Haiti or perhaps deep lakes like Superior or Baikal if flexible containers are used.

54651 (ANL-HEP-CP—82-24, pp 257-273) **Research and development program on dense TPC's at LBL.** Oddone, P; Nemethy, P. (Univ. of California, Berkeley). 1982. NTIS, PC A21/MF A01. (CONF-8206123—). Contract AC03-76SF00098.

From Workshop on proton decay experiments; Argonne, IL, USA (7 Jun 1982).

We have initiated a research and development program at LBL to develop high density TPC's. We are motivated by their potential use as tracking calorimeters to study nucleon decay. They may also be useful in the study of cosmic neutrino fluxes, double β decay and other low rate processes. Of these applications, the use of dense TPC's to study nucleon decay is the most challenging one because it requires instrumenting very large masses. Our R & D program is aimed at developing large TPC's which are competitive in cost with other proposed nucleon decay detectors while offering superior capabilities for energy resolution, particle identification and uniformity of response. There are two ways of obtaining high density TPC's: the first is to use a cryogenic liquid such as liquid argon or liquid methane; the second is to pressurize a gas such as argon or methane to several hundred atmospheres where the density of the gas approaches that of the liquid state. While we are interested in studying both approaches, we are concentrating on the high pressure approach since it offers the potential advantage of proportional wire amplification. A wire amplification of about 3 orders of magnitude would eliminate the noise problems which are inherent in ionization mode detectors such as liquid argon chambers. A possible 10 kton detector is described, and its properties are discussed in terms of tracking, energy measurements and particle identification. (WHK)

54652 (ANL-HEP-CP—82-24, pp 274-299) **Search for proton decay and solar neutrinos with a liquid TPC.** Chen, H.H. (Univ. of California, Irvine). 1982. NTIS, PC A21/MF A01. (CONF-8206123—).

From Workshop on proton decay experiments; Argonne, IL, USA (7 Jun 1982).

The liquid time projection chamber (TPC) concept is reviewed, and the status of development efforts, particularly at UC Irvine, is given. The possibility of applying the liquid argon TPC to searches for proton decay and for ^8B solar neutrinos with directional sensitivity is considered. Our present plan for the development of the liquid TPC is outlined.

54653 (ANL-HEP-CP—82-24, pp 300-332) **Other physics experiments at the Homestake Mine.** Cherry, M.L.; Davidson, I.; Lande, K.; Lee, C.K.; Marshall, E.; Steinberg, R.I. (Univ. of Pennsylvania, Philadelphia). 1982. NTIS, PC A21/MF A01. (CONF-8206123—).

From Workshop on proton decay experiments; Argonne, IL, USA (7 Jun 1982).

The Homestake Gold Mine presently houses the Brookhaven solar neutrino experiment and a 300-ton water Cerenkov detector at a depth of 4200 meters water equivalent. The Cerenkov detector has been used to study nucleon decay, multiple muons, and neutrino bursts. An array of liquid scintillator, with surface area of 130 m^2, is presently being constructed to measure magnetic monopoles, neutrino oscillations, underground muons, and neutrino bursts. At the same time, a 1 km^2 extensive air shower array is being built on the surface in order to measure the high energy cosmic ray composition with simultaneous surface and underground shower measurements. Future plans call for a 1406-ton liquid scintillator Tracking Spectrometer to measure nucleon decay, n-anti n transitions, and the low energy cosmic ray neutrino spectrum. We describe the present results and the possibilities for physics other than nucleon decay in the nucleon decay detectors.

54654 (ANL-HEP-CP—82-24, pp 333-351) **Physics of multiple muons in underground detectors.** Gaisser, T.K.; Stanev, T. (Univ. of Delaware, Newark). 1982. NTIS, PC A21/MF A01. (CONF-8206123—). Contract AC02-78ER05007.

From Workshop on proton decay experiments; Argonne, IL, USA (7 Jun 1982).

We summarize results of Monte Carlo simulations of underground muons with a set of parametrizations for number and lateral distribution of muons at various detector depths. We also describe the size distributions of accompanying showers at the surface. We give some illustrations of the use of these results to study the surface-underground correlation and to interpret preliminary results of the Soudan-I detector presented at this conference.

54655 (ANL-HEP-CP—82-24, pp 352-371) **Searching for the GUT monopole.** McIntyre, P. (Texas A & M Univ., College Station). 1982. NTIS, PC A21/MF A01. (CONF-8206123—).

From Workshop on proton decay experiments; Argonne, IL, USA (7 Jun 1982).

The GUT prediction of super-heavy magnetic monopoles has stimulated an intense activity to search for them. The recent observation of a candidate event by Cabrera suggests a very large flux. Energy loss processes are discussed, including several which are unique to monopoles. A large scintillation-counter telescope is being constructed to search for slow monopoles.

54656 (ANL-HEP-CP—82-24, pp 421-442) **Proposal for the establishment of a national underground physics laboratory.** Mann, A.K.; Sharp, R.R. Jr. (Los Alamos National Lab., NM). 1982. NTIS, PC A21/MF A01. (CONF-8206123—).

From Workshop on proton decay experiments; Argonne, IL, USA (7 Jun 1982).

Advances in elementary particles physics and astrophysics during the past decade have indicated certain areas in those fields in which experiments of high potential significance, albeit great difficulty, need to be done. In general, these are experiments that seek to uncover rare, new physical phenomena, or to study quantitatively phenomena that are especially difficult to observe. Among them are: (1) the study of solar and other cosmic neutrinos; (2) the search for nucleon instability; (3) the search for non-zero neutrino mass through the study of neutrino stability and double beta-decay; and (4) intensive searches for and attempts to measure accurately very energetic, rare elementary particle interactions such as may be manifested, for example, in the so-called Centauro events. The nature of these experiments requires that they be shielded from the intense flux of cosmic ray muons and air showers on the earth's surface, and therefore that the experimental apparatus be located deep underground or in the deep sea. However, for most of the experiments, and the apparatus also needs to be very large in mass and volume, and highly instrumented to achieve the necessary measurement capability. It is proposed to establish a laboratory deep underground of sufficient scope to be capable of housing and maintaining a variety of experiments that employ the most advanced technology. A specific channel is discussed whereby a national underground physics laboratory might be formed. The desirable characteristics of such a laboratory are described, and a possible location is recommended. Detailed cost estimates are provided. (WHK)

54657 (ANL-HEP-CP—82-24, pp 448-462) **Test of a flash chamber calorimeter as a nucleon decay detector.** Mikamo, S. (National Lab. for High Energy Physics, Tsukuba, Ibaraki, Japan). 1982. NTIS, PC A21/MF A01. (CONF-8206123—).

From Workshop on proton decay experiments; Argonne, IL, USA (7 Jun 1982).

We report the result of a beam test of a flash chamber calorimeter to be used as a nucleon decay detector. The capabilities and limitations of this type of calorimeter with a second generation experiment in mind are discussed.

54658 (ANL-HEP-CP—82-24, pp 463-470) **Geiger projection calorimeter.** Battistoni, G.; Bilokon, H.; Bologna, G. (Laboratori Nazionali di Frascati, Italy). 1982. NTIS, PC A21/MF A01. (CONF-8206123—).

From Workshop on proton decay experiments; Argonne, IL, USA (7 Jun 1982).

In view of a second generation p-decay experiment in the Gran Sasso Laboratory, a digital tracking calorimeter is being developed, based on the use of plastic tubes of the Mont Blanc detector type, which are operated in limited Geiser mode.

54659 (ARL/TR—050, pp 4-6) **Construction of radon/radon daughter calibration chamber.** Fry, J.; Gan, T.H.; Leach, V.A.; Saddlier, J.; Solomon, S.B.; Tam, K.K.; Travis, E.; Wykes, P. Jan 1983. NTIS (US Sales Only), PC A08/MF A01.

In Annual review of research projects 1981.

The radon/radon daughter test chamber is a copper lined room 1.65x1.75x2.75m with an effective volume of 8000 litres. The air residence time is controlled by circulating the air in the chamber through absolute filters which remove 99.9% of particulates. Radon is drawn into the chamber from a 17 μCi ^{226}RaCl source using the pressure differential across the blowers (<3 psi).

54660 (ARL/TR—050, pp 27-31) **Detector for use in high energy bremsstrahlung shielding studies.** Wilson, O.J.; Thomson, J.E.M. Jan 1983. NTIS (US Sales Only), PC A08/MF A01.

In Annual review of research projects 1981.

The design, development and calibration of a detector based on the principle of the Moxon-Rae detector is discussed. It is ideally suited to the measurement of the energy fluence of photons transmitted through a thick shield which has been irradiated with high energy bremsstrahlung. The detection sensitivity is 10^4 to 10^5 times that of the P2 ion chamber.

54661 (ARL/TR—050, pp 56-59) **Correction for the effect of humidity in free air ionisation chambers for x-rays other than those generated at 50 kV.** Hargrave, N.J. Jan 1983. NTIS (US Sales Only), PC A08/MF A01.

In Annual review of research projects 1981.

The humidity correction to be applied to ionisation chambers is discussed and expressions for calculating the effect are

given. The calculated humidity corrections fall between the two curves of values recommended by CCEMRI and suggest the use of energy dependent corrections, especially at higher humidities.

54662 (ARL/TR—050, pp 60-61) **Dissemination of survey meter calibrations.** Allen, P.D.; Hargrave, N.J. Jan 1983. NTIS (US Sales Only), PC A08/MF A01.

In Annual review of research projects 1981.

The Australian Radiation Laboratory has the authority to maintain primary standards of the quantity exposure and secondary standards of the quantity absorbed dose. A common system for calibration of dosemeters throughout Australia is being developed. It is proposed that each state be issued with a set of encapsulated ^{137}Cs sources encased in a shielded container providing collimated beams having exposure rates of 30 μR/h to 300 mR/h at 1 meter. To extend the facility to x rays an ionization chamber with measuring assembly would be included.

54663 (ARL/TR—050, pp 65-67) **Microcalorimetric standard of absorbed dose.** Huntley, R.B. Jan 1983. NTIS (US Sales Only), PC A08/MF A01.

In Annual review of research projects 1981.

Work on the design of a calorimetric standard of ionising radiation absorbed dose is reported. A graphite phantom of the microcalorimeter has been constructed.

54664 (ARL/TR—050, pp 85-90) **Improved measurement system for the whole body monitor.** Kotler, L.H. Jan 1983. NTIS (US Sales Only), PC A08/MF A01.

In Annual review of research projects 1981.

A static four-detector system has been established as a whole body radioactivity measurement system. A technique is being developed to position the detectors in such a manner as to minimise longitudinal distribution effects within a subject. This technique, which represents the human body as a simple geometric model, requires the determination of efficiency at any point within this model.

54665 (ARL/TR—050, pp 103-107) **Efficiency calibration of low energy photon spectrometers.** Burns, P.A.; Johnston, P.N.; Moroney, J.R. Jan 1983. NTIS (US Sales Only), PC A08/MF A01.

In Annual review of research projects 1981.

Uncertainties involved in the calibration of a low energy photon spectrometer are assessed. Calibration methods discussed are use of standardized sources, the x/gamma method, coincidence techniques and use of a detector of known calibration to determine the low energy photon emission rate. The energy region of interest is 8 to 25 keV.

54666 (ARL/TR—050, pp 118-119) **Solid state track detection using CR-39.** Langroo, M.K. Jan 1983. NTIS (US Sales Only), PC A08/MF A01.

In Annual review of research projects 1981.

Solid state track detectors have been used for the detection of fission fragments, heavy ions, alpha particles and recoil protons following collisions between hydrogen atoms and fast neutrons. CR-39, a thermosetting homopolymer with the empirical formula $C_{12}H_{18}O_7$ has been shown to have both a high sensitivity for recoil nuclei and a low background and offers promise as a neutron dosimeter. Its performance has been found superior to conventional emulsion dosimeters.

54667 (ARL/TR—050, pp 144-148) **Use of solid state detectors for spectrometry of conversion electrons emitted in the decay of lead-210.** Leith, I.S. Jan 1983. NTIS (US Sales Only), PC A08/MF A01.

In Annual review of research projects 1981.

The measurement of ^{210}Pb using silicon surface barrier detectors for spectrometry of the conversion electrons CEsub(LM) from the 46.52 keV transition was investigated. The effect of an air path and the adequacy of resolution of some SiSBD's were studied. The method offers promise provided the energy resolution can be improved.

54668 (CAPE—2871) **SLAC TAC shift register tester: LD 135-397-00-R0 Logic Diagram (2 sheets) (Engineering Materials).** (Stanford Linear Accelerator Center, CA (USA)). 1983. Contract AC03-76SF00515. USDOE-TIC, PO Bx 62, Oak Ridge, TN 37830.

Microfiche only, copy does not permit paper copy reproduction 35-mm aperature cards.

The logic diagram for the shift register tester provides the basic information and logic for designing the TAC Shift Register Tester. This device is used to diagnose shift register chip failures in the 32 TAC (Time to Analog Converter) module. The device takes known information which is loaded into the 32 channel shift registers of the tester and is then shifted into the 32 TAC module shift registers and then is shifted out of the TAC back into the tester for comparison in the CAMAC between the known information and the TAC derived information. Deviation or errors can then be detected and noted or the TAC can be repaired.

54669 (CEA-CONF—6560) **One nanosecond resolution time-to-digital converter.** Legrele, C.; Lugol, J.C. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). Oct 1982. 4p. (CONF-821011—53). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703569.

From IEEE nuclear science symposium; Washington, DC, USA (20 Oct 1982).

A one-nanosecond resolution time-to-digital converter for the SPES I detection near Saturne II has been built. Full ranges are 1 μs or 8 μs. A 125 MHz gated oscillator triggered by the start gives after a four-phase demultiplier a set of 16 signals of 32 ns period delayed by 1 ns. The stop memorizes 32 different configurations for the fine count in Gray code. The differential non linearity is = 0.25 ns.

54670 (CEA-N—2323) **Study of a large scale neutron measurement channel.** Amarouayache, A.; Ben Hadid, H. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). Dec 1982. 136p. (In French). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83703452.

A large scale measurement channel allows the processing of the signal coming from an unique neutronic sensor, during three different running modes: impulses, fluctuations and current. The study described in this note includes three parts: - A theoretical study of the large scale channel and its brief description are given. The results obtained till now in that domain are presented. - The fluctuation mode is thoroughly studied and the improvements to be done are defined. The study of a fluctuation linear channel with an automatic commutation of scales is described and the results of the tests are given. In this large scale channel, the method of data processing is analogical. - To become independent of the problems generated by the use of an analogical processing of the fluctuation signal, a digital method of data processing is tested. The validity of that method is improved. The results obtained on a test system realized according to this method are given and a preliminary plan for further research is defined.

54671 (CEA-R—5168) **Tests of health physics detectors and dosimeters to 6 and 9 MeV gamma-radiation.** (CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France)). Apr 1982. 51p. (In French). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83703453.

The CEA health physicists working group on standardization and testing of detectors for the measurements of external exposure has set up and calibrated a capture γ beam. Energies of 6 and 9 MeV were obtained by means of Ti and Ni targets. These beams made it possible to determine the response of a number of detectors and dosimeters used in health physics to these energy ranges. Most generally, these tests showed that at 6 or 9 MeV the responses of instruments calibrated with ^{60}Co γ-rays could vary as much as a factor 2 when compared to the maximum of the absorbed dose in a human body.

54672 (CERN—82-13) Cedar counters for particle identification in the SPS secondary beams: A description and an operation manual. Bovet, C.; Maleyran, R.; Piemontese, L.; Placci, A.; Placidi, M. (European Organization for Nuclear Research, Geneva (Switzerland)). 23 Dec 1982. 37p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83703062.

The Cerenkov Differential counter with Achromatic Ring Focus (Cedar) has been designed and a number built at Cern for the identification (and selection) of particles in the secondary beams of a high-energy accelerator. Cedar-N can separate kaons from pions up to 300 GeV/c but can detect protons only down to 60 GeV/c; Cedar-W can flag protons of 12 GeV/c and separate kaons from pions up to 150 GeV/c. After a brief account of the relevant physics of the Cerenkov effect, this report describes Cedars with emphasis on those characteristics and construction features that are of interest to the user. Details are given of the high-precision optical system, the mechanical construction to achieve uniform temperature (0.1 K) and rigidity, and the gas handling and measurement. The layout of the Cedars in the secondary beams of the Cern Super Proton Synchrotron is described. The signals provided to the user are listed and explained, together with the programs for on-line control of the counters. Details are given of the performances attained, together with various hints and suggestions on the procedure to follow in order to set-up, tune, and operate a Cedar. The dependence of the performance on beam optics is stressed.

54673 (CONF-8310157—1) Automated low-background alpha-counting system with large-area silicon detector. Fairman, W.D. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 3p. NTIS, PC A02/MF A01. Order Number DE83017911.

From 29. annual conference on bioassay, analytical and environmental chemistry; Seattle, WA, USA (12 Oct 1983).

An automatic alpha counter was designed and built. A sample changer is included that uses a photoelectric sensing circuit to read black bar codes on the bottom side of the collector rack for positioning the samples. Commercial NIM electronics are used for the system. A large-area, partially depleted, ruggedized silicon detector is used. (LEW)

54674 (CRN-CPR—82-17) Photoelectron-photon coincidences in anthracene crystals. Klein, G. (Strasbourg-1 Univ., 67 (France). Centre de Recherches Nucleaires). 1982. 17p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703454.

Photoelectron-photon coincidences have been measured in anthracene crystals excited by photons of 10-50 eV energy. Conclusions are given about the relaxation processes in high energy excited states.

54675 (DOE/ER/10688—T1) Search for rare decay modes of the muon. (Stanford Univ., CA (USA)). 1982. Contract AT03-80ER10688. 3p. NTIS, PC A02/MF A01. Order Number DE83017455.

A brief summary is given on progress in producing an experimental apparatus, called the Crystal Box detector, for searching for extremely rare decay modes of the muon (those decays violating lepton number conservation). The Crystal Box consists of a large solid angle modular NaI(Tl) detector enclosing a cylindrical set of drift chambers and a trigger hodoscope. Associated electronic equipment is also described briefly. (LEW)

54676 (DOE/EV/10402—T2) Positron ring system using one-dimensional Anger-type detectors. Progress report, January 1, 1983-December 31, 1983. Muehllehner, G. (Pennsylvania Univ., Philadelphia (USA)). Sep 1983. Contract AC02-80EV10402. 17p. NTIS, PC A02/MF A01. Order Number DE83018072.

A single-ring positron camera has been completed to the point where a variety of different objects have been imaged. This includes the construction of six position-sensitive single-crystal detectors with their associated electronics, the data acquisition system which acquires data simultaneously from nine possible coincident pairs of detectors, and the necessary software to reorganize the data into the appropriate format, reposition scintillation events to account for nonlinearities in the detectors, and reconstruct a transverse section image using a filtered backprojection algorithm. A spatial resolution below 8 mm full-width-half-maximum (FWHM) has been measured; other performance parameters have yet to be determined.

54677 (EFI—499(42)-81) Characteristics of ionization chambers filled with nitrogen. Avakyan, K.M.; Azizbekyan, G.V.; Mnatsakanyan, P.S. (Erevanskij Fizicheskij Inst. (USSR)). 1981. 16p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703455.

Amplitude-time characteristics of nitrogen-filled ionization chambers for operation in a large area 1600 m^2 calorimeter of the ANI device for investigation of superhigh energy (10^{15}-10^{16} eV) cosmic radiation are studied. As to choice of the chamber optimized design the multiwire and the cylindrical chambers of different diameters under different pressures and the N_2 purity levels have been tested. Saturation curves for nitrogen purity 99.999% and 99.99%, pressures from 1 to 4 atm., and at oxygen additions from 0.02 to 0.1%. The dependence of electron collection time on applied voltage and probability of electron adhesion on its average energy, chamber amplitude characteristics are presented. It is shown that the nitrogen filled ionization chambers performance together with the large calorimeter ensure perfect operating performances and technological and operation advantages over argon chambers.

54678 (EFI—500(43)-81) Unified system of collection, processing of experimental information and control. Vasinyuk, I.E.; Dadyan, A.T.; Martirosyan, G.M.; Nanasyan, A.S.; Torosyan, S.A.; Avetisov, L.G.; Avetyan, B.A.; Demirkhanyan, M.Kh.; Manucharyan, A.S. (Erevanskij Fizicheskij Inst. (USSR)). 1981. 43p. (In Russian). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83703091.

A system for a physical experiment automatization based on the "Electronika-60" microcomputer, the flexible disk storage device and the CAMAC crate is described. The basic requirements to the system, as well as the applied method of arranging the fast hardware data transmission between the modules in the CAMAC crate are discussed. The description of the basic set of the developed CAMAC modules used in the complex, and the corresponding system software are given.

54679 (IFVE-OEA—82-141) Electronic read-out system for the drift chambers of a neutrino calorimeter. Bushnin, Yu.B.; Isaev, A.N.; Konoplyannikov, A.K.; Marchikhin, N.K.; Sen'ko, V.A. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1982. 13p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703063.

In the paper a read out module set of electronic equipment for data output from the wide-gap drift chambers of the IHEP neutrino calorimeter is described. The drift chamber with a multiwire signal element allows one to measure the track projection with simultaneous resolution of the left-right ambiguity within the limits of one chamber. Drift chamber characteristics, beam fast extraction onto the target of the neutrino calorimeter ($<=$ 30-50 μs), necessity of multiple signal detecting from one drift chamber wire for one beam spill have determined the basic parameters of the recording electronics consisting of three types of modules: 4-channel module of amplifiers-shapers, 24-input time-to-digital converter module with memory capacity for 64 signals, timer-generator module for control of gate-triggering and "time-code" conversion in the regime of measurements and for development of test signals in the regime of equipment testing. The whole equipment, with the exception of amplifiers, is realized in the CAMAC-"Vector" system. The equipment provides with detecting the time position of 64 signals from detectors in one converter module with 10 ns accuracy per accelerator beam spill.

54680 **(IFVE-OEF—82-49) Apparatus for measuring the polarization in charge-exchange reactions.** Avvakumov, I.A.; Apokin, V.D.; Belikov, N.I. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1982. 24p. (In Russian). (SERP-E—112). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703065.

The apparatus involved in the modified PROZA installation aimed for measuring polarization in charge-exchange reactions are described. Specific features and main characteristics of beam monitors, the guard system providing the level of neutral trigger, the Cherenkov total absorption spectrometer for gamma detection consisting of 260 counters with lead glass radiators having the dimensions of 38x38x450 mm, the hodoscope for detector spatial orientation and the involved electronic equipment are discussed. The PROZA installation software used when operating on-line with the HP-2100 A computer is considered. By means of the apparatus under consideration interesting results are obtained when studying the polarization in the elastic charge-exchange reaction $\pi^- + p$ vector $\rightarrow \pi^0 + n$ vector at the energy of 40 GeV/c in the momentum range of 0-2 $(GeV/c)^2$.

54681 **(IFVE-OEF—82-58) Increasing uniformity of light collection in extended scintillation counters by means of spectral shift of scintillator emission.** Datsko, V.S.; Peresypkin, A.I.; Pototskaya, N.N.; Prikhod'ko, E.D.; Ronzhin, A.I.; Rykalin, V.I.; Skripkina, V.T. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1982. 24p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703066.

Two ways of light-collection uniformity increase in extended scintillators on the account of radiative mechanism of energy transfer between luminescent components are proposed and realized for the first time. With the decrease of the spectrum shifter concentration the energy transfer from the first component to the spectrum shifter becomes mainly radiative. It allows to compensate the light-collection non-uniformity about 1.5 times by means of the effective reflector, positioned without an optical contact to the scintillator lateral surfaces and the optical filter which let the radiation transmission only from the spectrum shifter to the photomultiplier. In the second case the compensated light-collection non-uniformity exceeds 10 times, using an external film spectrum shifter, covering the lateral surfaces of the scintillator with an optical contact, and the filter, transmitting the radiation from the spectrum shifter. The decrease of the scintillation signal from the most distant parts of the scintillator constitutes 1.5-2 times in the methods under consideration.

54682 **(IFVE-OEF—82-149) Hodoscope shower detector calibration by the $\pi 0$ (eta^0)$\rightarrow 2\gamma$ decay.** Akimenko, S.A.; Belousov, V.I.; Blik, A.M.; Kolosov, V.N.; Kut'in, V.M.; Pavlinov, A.I.; Solov'ev, A.S.; Bannikov, A.V.; Krumshtejn, Z.V. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1982. 11p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703064.

The hodoscope shower detector (HSD) with a large cell-200x200x350 mm and its calibration by π^0- and (eta^0) mesons $\rightarrow 2\gamma$ decay are described. The HSD represents "a wall' composed of TF-5 lead glass bloc. Seven series by seven elements each form a square of 1.4x1.4 m. For calculating gauge coefficients two similar algorithms have been used. The first algorithm is based on the assumption that in mass distribution in the eta^0(π^0) meson peak region each γ detector element must operate the same number of times in the events to the left and to the right from the centre of grafity. The second algorithm is based on the assumption that eta^0(π^0) the peak centre of gravity in distributions by effective mass of two γ-quanta nust coincide independently in which elements shower recording has occured. The iteration method has been used in the calculations. A satisfactory coincidence of $\gamma\gamma$ effective mass spectra obtained after calibration by the first and the second algorithms has been observed. The calibration method described may serve as an addition to the usually practised calibration in the monoenergetic electrons or replace it.

54683 **(IFVE-ONF—82-97) Installation for studying pion radiative scattering on nuclei.** Akopdzhanov, G.A.; Antipov, Yu.M.; Batarin, V.A. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1982. 12p. (In Russian). (SERP-E—143). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703067.

The SIGMA installation used for studying pion minus radiative scattering on nuclei is described. The particle beam with the momeitum of 40 GeV/c produced at the accelerator internal target is focused on a studied target. The flux of particles on the target is determined using scintillation counters. Pions minus are separated by means of the differential and threshold gas Cherenkov counters. Coordinates and angles of particles are measured by means of scintillation hodoscopes with space coding and two sets of proportional chambers. Pion minus detector consists of a scintillation hodoscope (five counters having dimensions of 100x10x1 cm) and Cherenkov total absorption counters covering the area of 50x100 cm. Pion minus momentum are measured by means of the magnetic spectrometer consisting of a magnet, a system of proportional chambers and a system of spark chambers. According to a trigger signal the data from beam monitors, scintillation hodoscopes, proportional and spark chambers and Cherenkov counters is recorded into the SUMMA system units and then transmitted to the HP-2100 computer through a special interface. The computer provides on-line control over the equipment operation, data recording on a magnetic tape and realizes the event geometrical reconstruction and physical analysis. Measurement of incident particle tracks by two independent systems (hodoscopes and proportional chambers) gives an opportunity to check continuously the efficiency of each system and provides precise track timing. The accuracy of incident particle coordinate and angle measurement constitute correspondingly 0.6 mm and 0.11 mrad.

54684 **(IFVE-OP—82-117) Particle dosing for a bubble chamber in the microsecond time range of beam extraction.** Bryukhanov, N.S.; Vakhromeev, B.A.; Gubrienko, K.I.; Zelenin, V.E.; Kotov, V.I.; Prosin, B.V. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1982. 11p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703068.

For intensity stabilization at the inlet of the "ilirabelle" bubble chamber in the microsecond duration of beam extraction a new beam formation system is applied. A pulse bending magnet translates the beam outside the limits of the irradiated setup upon counting of the required number of particles at 5.2 μs duration of bean extraction. The dependences of chamber limiting efficiency on the average number of particles required are obtained. On the basis of these dependences the relations that allow to make a proper choice of the basic parameters for the system elements and their mutual location have been defined. The diagram of the system elements location and the principal circuit of the pulse magnet power supply are presented. The beam formation system has been tested while the pp tilde experiment. The beam translation in the collimator plane with switch on magnet is measured. The beam centre shift corresponds to the flattop of current pulse and agrees well with the calculation value. The pulse magnet doesn't effect image contamination by background particles. Calculational value of efficiency of taking pictures in the bubble chamber agrees well with the experimental value. The beam formation system application increases the chamber efficiency by 1.32 times.

54685 **(INS—442) High resolution position detecting system with a SWPC for electron spectroscopy.** Fujita, Y.; Kawakami, H.; Hosoda, M. (Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study). Dec 1981. 15p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703069.

A position sensitive single wire proportional counter (SWPC) by a charge division method has been developed for a focal plane detector of the INS $\pi\sqrt{2}$ iron-free β-ray spectrometer (rho = 75 cm). Good position resolutions, 0.3 mm (FWHM) for electron energy higher than 200 keV and 1 mm for 40 keV electrons, have been obtained with integral position linearity of 0.2%. Analytical expressions of the charge division mechanism for pro-

portional counter pulses, which have a logarithmic rise, are presented. The relations between the performance parameters, which are position resolution, linearity and counting rate, and the characteristic parameters of the wire, charge amplifier and shaping network are also given. A new effect that the effective counter depth becomes one-half of the actual depth was found. This effect (HALF DEPTH EFFECT) is useful for detection of the position of low energy electron. A new high accuracy (0.1%) and high speed (15 μs) digital divider system has been developed with use of the successive approximation type ADC.

54686 **(INS-J—163) Study of fine dE/dX sampling with a longitudinal drift chamber.** Naito, F.; Imanishi, A.; Ishii, T.; Ohshima, T.; Okuno, H. (Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study). Feb 1982. 37p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83703070.

Fine dE/dX sampling with a longitudinal drift chamber has been investigated with emphasis on the application to a large-scale detector system. The dE/dX measurement is made with 40 ns sampling intervals, which corresponds to 1.4 mm sampling thickness in Ar(90%) + CH_4(10%) gas mixture, over a 50 mm drift space of our test chamber. The obtained separation of pions and electrons of 500 MeV/c is 10σ - 12σ for the simulated one-meter long tracks, where σ is the r.m.s. resolution of the dE/dX measurement. Particle separation with 1.4 mm sampling thickness is better by a factor of 1.7 compared to the one with 21 mm sampling thickness. It is found that the good signal shaping is crucial to get the better dE/dX resolution when the wider drift space is used.

54687 **(INS-TL—140) Theoretical analysis of charge division proportional counter.** Fujita, Y.; Kawakami, H. (Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study). Dec 1981. 33p. (In Japanese). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83703071.

A detailed analysis of charge division proportional counter, which has a logarithmic rise pulse, is discussed. Various analytical expressions of induced pulse shape, position linearity and resolution are derived. Some remarks, for designing position sensitive proportional counter with good position linearity and resolution, are also presented.

54688 **(INS-TL—141) Development of a new digital divider system for the charge division method.** Fujita, Y.; Kawakami, H.; Hosoda, M. (Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study). Dec 1981. 14p. (In Japanese). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703072.

A high accuracy and high speed digital divider system, of new principle, has been developed for the charge division method, with use of the 12 bit successive approximation type ADC's and 16 bit shift resister. It is shown that the result of division has a good differential linearity when high bit ADC's are used, even if it has the poor differential linearity. The position resolution of 0.1% and high speed of 15 μs are obtained. The block diagram, the detailed electronic circuits and the timing chart of the system are presented.

54689 **(INS-TL—142) Proposal of new avalanche mode detector for high energy heavy ion and particle physics experiments.** Fujita, Y.; Imamura, M. (Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study). Dec 1981. 12p. (In Japanese). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702987.

A new type of parallel plate avalanche counter (PPAC) is proposed and designed. This consists of a drift region for primary electrons and a avalanche region (PPAC) with a meshed cathode through which drifted electrons enter. Calculation shows both time and energy resolution should be better than conventional wire counters. Applications of the counter, of this type, to the detection of high energy heavy ion and high energy physics experiments are discussed.

54690 **(IPPJ-DT—89) Measurement of environmental radioactivity in Toki district.** (Nagoya Univ. (Japan). Inst. of Plasma Physics). Nov 1981. 78p. (In Japanese). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83703073.

When the Institute of Plasma Physics, Nagoya University, expressed the hope to move into Toki district, the environmental problems accompanying the movement were discussed. The effect of the radioactivity leaking from the nuclear facility on human bodies must be far smaller than that of natural radiation, and for the purpose, the amount and fluctuation range of the natural radiation in the district must be known. The initial objectives of this cooperative research were to study on environmental radiation and to make a Geiger counter for the measurement. In 1981, a scintillation counter will be completed, and using a multi-channel pulse height analyzer, the nuclides which are the source of environmental radiation emission will be identified, and the tritium in natural water will be detected. Thus, the evaluation of environmental radiation can be carried out, and the situation before the movement of the research facility can be grasped. In this paper, the natural radioactivity in earth, atmosphere and water and cosmic ray, artificial radioactivity, and environmental radiation exposure dose are reported. Also, the manufacture of a GM counter measuring instrument and the measurements of cosmic ray background, typical earth samples and environmental radioactivity with the GM counter are reported. The related data are attached.

54691 **(ITEF—64(1982)) Unit of high-speed decimal scaler with computer indication and control.** Belova, N.K.; Martem'yanov, A.N. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Teoreticheskoj i Ehksperimental'noj Fiziki). 1982. 6p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703083.

The structure and principle of operation of high-response six-digit decimal counter constructed in the "Chereshnia" standard and which permits to realize pulse counting with high pulse repetition rate are described. The unit operation control is realized by means of the frame of channel commands "Vector" standard as well as of the buttons of the front panel. Input pulses come through the emitter follower invertor, short pulse shaper and gate circuit to the counting input of the first decade constructed on two triggers. Pulses from the first decade output increase to 40 nc in the flip-flop circuit and transform into transistor-transistor logic-levels by the level converter. The further pulse counting is realized in the scaling decades assembled on micro-electronic circuits. Decade digit states are fed to read-out buses of output rectifiers and to multiplexers of the dynamic indication circuits. Two regimes of pulse count are possible: continuous count and pulse count only at the presence of external control signal. Maximum frequency of count pulses is 140 MHz. The block diagram of the described counter in given.

54692 **(ITEF—104(1982)) Threshold Cherenkov counter.** Kanavets, V.P.; Martynov, V.I.; Morozov, B.V.; Nesterov, V.M. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Teoreticheskoj i Ehksperimental'noj Fiziki). 1982. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703074.

Threshold Cherenkov counters with water and plexiglas radiators with diffusion light reflection employed for investigating inelastic and elastic reactions in the polarized proton target are described. The counter effective area is 600x400 mm. For Cherenkov radiation detection eight photomultipliers, located in two groups by four at opposite radiator faces in two light protective steel housings are used. For determining counter efficiency over the whole working volume one can shift it in the plane perpendicular to the beam. The recording efficiency constitutes 99.i+-0.5%. To reduce noise the photomultipliers are cooled with liquid nitrogen vapours. The liquid nitrogen consumption at the average temperature in the cooled volume -k deg C constitutes 1.9 l/h, the noise level being reduced six times. Prethreshold particle detection has been investigated on the proton and π^+ meson beam. The prethreshold proton recording efficiency agrees well with the results of calculations.

54693 **(JINR—10-82-351) Multicomputer measurement centre of the Laboratory of nuclear physics - a prototype of computer network for automation of scientific research.** Vagov, V.A.; Vladimirov, V.A.; Elizarov, O.I. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics). 1982. 16p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703084.

The measurement centre of the Laboratory of Nuclear Physics intended for experimental researches of a wide scope on the IBR-30 and IBR-2 reactors is described. The development of the structure of the measurement centre based on the PDP-11/70, SM-3, SM-4, MERA-60/30, Electronica-100/16i computers and CAMAC devices is shown. The centre has a developed terminal network and a corresponding software. The modern structure of the centre permits to solve problems of mesurement organization and data acquisttion, control of experimental systems, archivization and processing of acquisited data etc. considering the multicomputer measurement centre of LNP as a prototype of computer network for scientific research automation.

54694 **(JINR—10-82-490) Generalized formulas for determining kinematic parameters of charged particle tracks with the account of total error matrix in factorized representation.** Odintsov, V.G. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1982. 7p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703075.

A mathematical model is presented on which base a rapid algorithm for determination of kinematic parameters of charged particle tracks with arbitrary number of measured points is developed. The track parameters are determined taking into account error total matrix in factor representation. The aim of the work is to obtain appropriate analytical representation for formulas needed to determine kinematic parameters of charged particle tracks. In particular, such representation has been for parameters of rectangular tracks. The algorithms could be used for processing both chamber photographs and of the electron experimental data.

54695 **(JINR—13-82-90) Position-sensitive semiconductor detectors of nuclear radiations.** Sandukovskij, V.G. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1982. 17p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703077.

The position-sensitive detectors made of Si and Ge are considered, which are used to gain a simultaneous information on the coordinate and particle energy of nuclear radiations. The methods of amplitude and time extraction of the coordinate information are discussed. The problems of the optimal position resolution are considered for the case of amplitude method provided that the nonlinearity of detector response is $<= 1\%$. The methods of measurement of the position resolution and linearity of the above mentioned detectors by the α-particles, light signal generation and by the noise of the position channel of the detector are presented. The use of the semiconductor position-sensitive detectors in nuclear physics and related sciences is described. The limitations imposed on the resolution and detector size are shown.

54696 **(JINR—13-82-318) Event selection in the experiments on studying μ-atomic and mesic molecular processes.** Bystritskij, V.M.; Rudenko, A.I.; Suvorov, V.M.; Khovanskij, N.N.; Khomenko, B.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1982. 7p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703085.

The structure of an electronic logic circuits used in experiments on studying μ-atomic and mesic molecular processes taking place after muon minus stopping in a substance is described. The logic structure under consideration gives an opportunity to optimize the process of the detected event selection both at an apparatus level and during their computerized analysis as well as it provides an effective control of the whole system performance during prolonged exposures to muon beams. The conclusion is drawn that besides a considerable simplification in the electronic logic circuits their reliability is increased and the detecting system functional capabilities are improved.

54697 **(JINR—13-82-452) Organization of the RISK spectrometer electronic logic circuits on the base of the event preliminary selection unit.** Krumshtejn, Z.V.; Nikolina, A.A.; Petrukhin, V.I.; Khovanskij, N.N.; Shelkov, G.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1982. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703076.

The flowsheet of electronic logic circuits for the RISK hybrid magnetic spectrometer used for studying rare hadron-hadron and hadron-nucleon interactions is described. The circuit specific feature is the use of an event preliminary selection unit (PSM) to which signals from the primary particle indentification detectors placed near the streamer chamber are transmitted. PSM is made in the CAMAC standard. The K500 seies ECL type integrated circuits are used. The PSM application helps to decrease the time of event complete identification and cable delays in channels of secondary particle detectors and to unify the event selection circuits in experiments with the RISK spectrometer.

54698 **(JINR—13-82-763) Investigation of large cylindrical scintillation spectrometer section.** Antipov, Yu.M.; Gorin, Yu.P.; Datsko, V.S.; Petrukhin, A.I.; Mitsel'makher, G.V.; Nozdrin, A.A.; Smirnova, S.L. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1982. 6p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703570.

The results of investigation of large cylindrical scintillation spectrometer section to measure slow particle energy, for instance, of recoil protons which fly out of liquid hydrogen target in the bombardment by high energy particles, are presented. The plastic scintillator section has a trapezoidal form with the 56 mm and 106 mm bottoms and the 250 mm height. The section length is 800 mm. Light-collection is carried out by light pipe-spectra shifter. The factor of light collection nonuniformity does not exceed 8%. The energy resolution for 200 MeV recoil protons is estimated as approximately 7% (total width half maximum).

54699 **(JINR—13-82-764) Two loop circuit of pulse charoge of forming lines for streamer chamber supply.** Aksinenko, V.D.; Dement'ev, E.A.; Kaminskij, N.I.; Matyushin, A.T.; Matyushin, V.T.; Nurgozhin, N.N. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1982. 10p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703571.

Two-loop circuit to charge the impulse forming lines is proposed. This circuit is analysed, diagrams are presented. Modification of using this circuit in practice and recommendations on its realization in a generator to supply streamer chambers are given.

54700 **(JINR—16-82-444) Application of the plastic scintillator counter for measuring the high-energy neutron spectra.** Alejnikov, V.E.; Komochkov, M.M.; Solodilov, A.V.; Timoshenkoe, G.N. (Joint Inst. for Nuclear Research, Dubna (USSR). Dept. of Radiation Safety). 1982. 4p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703078.

The method for measuring the neutron spectra which can be used when solving the problems of dosimetry and radiological protection at high-energy accelerators is suggested. The plastic scintillator on the base of polystyrene 120 mm in diameter and 120 mm height is used as a neutron detector. Calculation of the neutron detection efficiency is performed using the Monte Carlo method by means of the STANTON code. The results of the described method testing show that the reconstructed spectra describe the given test ones correctly. The conclusion is made that the suggested method can be used for neutron spectrometry in scattered radiation fluxes in the energy range of 15-500 MeV.

54701 **(JINR—E-10-82-136) One problem of the busy period determination in queues with infinitely many servers.** Dvurecenskij, A.; Kuljukina, L.A.; Ososkov, G.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation). 1982. 10p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703079.

In the paper the problem of the discretized cluster length probability determination based on the scanning in the track chambers is considered. This problem is solved in the frame of the queueing system with infinitely many servers as a discretized busy period probability determination of this system. The precise formulae of a probability are given and it is proved that those probabilities converge weakly to the probability distribution of the nondiscretized cluster when the discretization steps are diminished.

54702 **(JINR—E-13-82-421) Reversal film development for streamer chamber track photographs.** Bahr, J.; Schmidt, I. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1982. 9p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703080.

It is the aim of this work to create a method of photographic development specially adapted to streamer image recording, i.e., with high sensitivity, only two signal levels, low dependence of the track signal on image intensity having a great jitter and noise suppression. The method has to be suitable for machine development of high speed films. A reversal photographic development was used to realize these demands, whereby strong fogging in the first step negative development and a solving process for silver bromide after blackening are specially introduced process stages. This results in a step-function shaped characteristic curve with small transition region having only two signal levels, i. e., independence of streamer image density, good resolution, fine grain, suppression of flares and low noise in the signal of the clear streamer images.

54703 **(JINR—R-10-82-597) Assembly and copying of the results of multiview events from the RISK chamber measured on AELT-2/160 device.** Stepanenko, V.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation). 1982. 13p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703098.

The results of measurements of each two stages on the AELT-2/160 device are written on magnetic tapes in a modified computer independent format as separate files. A package of dialogue FORTRAN programs for automatic and selective unification, editing of the data from magnetic tapes has been created on a control computer of AELT-2/160 device. These methods of assembly, checking of measurements and methods of documentation of mass processing of complicated multiview events are successfully used in the BESM-4 computer for data transmission to more powerful computers (BESM-6, CDC-6500, ES-1040). It is possible to accumulate in an analogous way the measurement results from other measuring devices or on a mini-computer with disc storage.

54704 **(JINR—R-13-82-547) Spectrometer for studying spontaneous radiation emitted during high-energy electron and positron channeling in monocrystals.** Vodop'yanov, A.S.; Vojtkovska, I.; Golovatyuk, V.M. (Joint Inst. for Nuclear Research, Dubna (USSR)). 1982. 19p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703081.

The "Crystal" installation for studying characteristics of radiation emitted during relativistic electron and positron channeling in monocrystals is described. The main parameters of radiation detectors, gamma spectrometer, recording and control electronic circuits and on-line computer codes are given. An electron (positron) beam is incident on a monocrystal target fixed in a remote-controlled goniometer. A system of drift chambers grouped in three units is used for determining the particle tracks in front of and behind the target. The fourth unit of drift chambers serves for determining the particle tracks behind an analyzing magnet gamma photons emitted from a target are detected by a scintillation counter on the base of the CsI(Tl) monocrystal surrounded with a lead shield and a system of anti- coincidence counters. Angles of gamma photon emission are measured by means of a drift chamber unit having a built-in converter fixed directly in front of the gamma spectrometer radiator. Cherenkov lead glass shower counters covering the momentum range of 5-10 GeV/c are used for secondary electron (positron) identification. The installation is triggered by a system of coincidence and anticoincidence counters and operates on-line with the ES-1040 computer. The installation recording system is designed in the CAMAC standard. The installation provides resolution by scattering angle equal to about 33 μrad. It is able to detect upto 1400 events per second and involves developed software system.

54705 **(JINR-R—15-82-706) Method of summation of amplitudes of coinciding pulses from Ge(Li) detectors used to study cascades of gamma-transitions in (n,γ) reaction.** Bogdzel', A.A.; Vasil'eva, Eh.V.; Elizarov, O.I. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics). 1982. 11p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703572.

Main performances and peculiarities of spectrometer based on the coincidence pulse amplitude total-count method and containing two Ge(Li) detectors with transmission neutron spectrometer - IBR-30 pulse reactor are considered. It is shown on the $^{35}Cl(n, \gamma)$ reaction that the method of summation of amplitudes of coinciding pulses from the Ge(Li) detector can be used to study the cascades of two γ-transitions with a total energy similar to the neutron binding energy. The shape of the response function of this spectrometer was studied versus the energies of γ-transition cascades.

54706 **(LBL—15973) Collider detectors: present capabilities and future possibilities.** Loken, S.C.; Nemethy, P. (eds.). (Lawrence Berkeley Lab., CA (USA)). Apr 1983. Contract AC03-76SF00098. 196p. (CONF-830224—). NTIS, PC A09/MF A01. Order Number DE83015006.

From DPF workshop on collider detectors: present capabilities and future possibilities; Berkeley, CA, USA (28 Feb 1983).

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Separate abstracts were prepared for 27 papers in this conference proceedings. Thirteen other papers had been previously abstracted for EDB. (LEW)

54707 (LBL—15973, pp 5-20) **Experience of the axial field spectrometer at the CERN ISR.** Willis, W.J. (CERN, Geneva, Switzerland). Apr 1983. NTIS, PC A09/MF A01. (CONF-830224—).

From DPF workshop on collider detectors: present capabilities and future possibilities; Berkeley, CA, USA (28 Feb 1983).

Eight mutations of the Axial Field Spectrometer are described, with brief descriptions of the physics aims of each and the list of collaborating institutions involved. The triggering system, which involves a number of levels, is described, followed by a discussion of analog processing, including summing and weighting. Detector issues associated with high rates are briefly discussed, especially pile-up. Radiation damage and lifetime of calorimeters near the beam at ISR is covered. (LEW)

54708 (LBL—15973, pp 43-48) **Tracking detectors.** Hartill, D. Apr 1983. NTIS, PC A09/MF A01. (CONF-830224—).

From DPF workshop on collider detectors: present capabilities and future possibilities; Berkeley, CA, USA (28 Feb 1983).

The problem of tracking charged particles in the cross of high energy jets in a high rate environment is considered giving attention to the general vertex detector, the central and forward regions for 1 TeV pp collider with a luminosity of $10^{33}cm^{-2}sec^{-1}$, and possible tracking devices for a 20 TeV hadron hadron collider. Finally, the research and development needs to provide adequate tracking for the next generation of collider detectors are discussed. (LEW)

54709 (LBL—15973, pp 49-57) **Calorimetry.** Pope, B. Apr 1983. NTIS, PC A09/MF A01. (CONF-830224—).

From DPF workshop on collider detectors: present capabilities and future possibilities; Berkeley, CA, USA (28 Feb 1983).

An overall review of properties of various types of calorimeters is given, with special attention given to the challenges of high luminosity and high energy. The calorimeters described include continuous calorimeters, scintillation sampling calorimetry, gas sampling calorimetry, and liquid ionization calorimeters. Next explored are some limiting factors involved in experiments at high luminosities (or at high energies), and some examples are offered of detectors capable of operating at the highest luminosities (energies).

Specific areas where substantial research and development work is needed are itemized. (LEW)

54710 (LBL—15973, pp 58-61) **Triggers.** Shochet, M. Apr 1983. NTIS, PC A09/MF A01. (CONF-830224—).

From DPF workshop on collider detectors: present capabilities and future possibilities; Berkeley, CA, USA (28 Feb 1983).

The possibility of trigger systems which could operate at a luminosity of $10^{33}cm^{-2}sec^{-1}$ is examined, concentrating on two luminosity problems: the fast trigger decisions which must be made because of the high interaction rate, and the effect of multiple interactions within the integration time of the detector. It is concluded that a trigger system for high luminosity operation can be constructed, although the system presented is not optimal. Also discussed are mulitple event pileup, tracking, electron identification, and transverse momentum imbalance. (LEW)

54711 (LBL—15973, pp 62-63) **Particle identification.** Nygren, D.R. (Lawrence Berkeley Lab., CA). Apr 1983. NTIS, PC A09/MF A01. (CONF-830224—).

From DPF workshop on collider detectors: present capabilities and future possibilities; Berkeley, CA, USA (28 Feb 1983).

A variety of subjects are addressed within the general context of searching for limitations in capability of particle identification due to high average rates. Topics receiving attention included Cerenkov ring imaging, transition radiation, synchrotron radiation, time-of-flight, high P spectrometer, heavy quark tagging with leptons, general purpose muon and electron detector, and dE/dx. It is concluded that particle identification will probably not represent a primary obstacle at luminosities of $10^{33}cm^{-2}sec^{-1}$. (LEW)

54712 (LBL—15973, pp 64-72) **Detector systems.** Barish, B.C. (California Inst. of Tech., Pasadena). Apr 1983. NTIS, PC A09/MF A01. (CONF-830224—).

From DPF workshop on collider detectors: present capabilities and future possibilities; Berkeley, CA, USA (28 Feb 1983).

The design and characteristics of detectors applicable at 20 TeV are discussed, followed by detector considerations for a high luminosity hadron-hadron machine. (LEW)

54713 (LBL—15973, pp 81-87) **Performance of a 16000 wire Mini-Drift MWPC system.** Chauvat, P. (CERN, Geneva, Switzerland); Cousins, R.; Hayes, K.; Smith, A.M.; Bonino, R.; Ellett, J.; Medinnis, M.; Russ, A.; Schlein, P.E.; Sherwood, P. Apr 1983. NTIS, PC A09/MF A01. (CONF-830224—).

From DPF workshop on collider detectors: present capabilities and future possibilities; Berkeley, CA, USA (28 Feb 1983).

The Mini-Drift chamber system and associated electronics employed in experiment R608 at the CERN-ISR are described. The performance of the system which utilizes 3mm spacing MWPCs produces a spatial resolution of $\sigma = 180\ \mu$ under experimental conditions.

54714 (LBL—15973, pp 88-96) **Breakdown processes in wire chambers, prevention and rate capability.** Atac, M. (Fermi National Accelerator Lab., Batavia, IL). Apr 1983. NTIS, PC A09/MF A01. (CONF-830224—).

From DPF workshop on collider detectors: present capabilities and future possibilities; Berkeley, CA, USA (28 Feb 1983).

Breakdowns were optically and electronically observed in drift tubes and drift chambers. They occur at a critical gain for given intensity in a gas mixture when ultraviolet photons are not completely quenched. It was observed that the breakdowns depended critically on average current for a given gas mixture independent of the size of the drift tubes used. Using 4.6% ethyl alcohol vapor mixed into 50/50 argon ethane gas, breakdown are eliminated up to 7 /sub μ/A average current drawn by pulses on a 1 cm section of an anode wire under an intense source. Pulses with an avalanche size of 10^6 electron rates above 10^6 pulses per centimeter per wire may be obtained with the elimination of breakdowns.

54715 (LBL—15973, pp 106-107) **Scintillation chamber of calorimeters for colliding beam detectors.** Jones, L.W. (Univ. of Michigan, Ann Arbor). Apr 1983. NTIS, PC A09/MF A01. (CONF-830224—).

From DPF workshop on collider detectors: present capabilities and future possibilities; Berkeley, CA, USA (28 Feb 1983).

It is suggested that the scintillation chamber, a technique first discussed almost thirty years ago, might find application in colliding beam detector systems, in particular as a means of efficiently extracting detailed spatial and energy information from a sampling calorimeter.

54716 (LBL—15973, pp 108-110) **High energy electromagnetic shower position measurement by a fine grained scintillation hodoscope.** Cox, B. (Fermi National Accelerator Lab., Batavia, IL); Hale, G.; Mazur, P.O.; Wagner, R.L.; Wagoner, D.E.; Areti, H.; Conetti, S.; Lebrun, P.; Ryan, T.; Gearhart, R.A. Apr 1983. NTIS, PC A09/MF A01. (CONF-830224—).

From DPF workshop on collider detectors: present capabilities and future possibilities; Berkeley, CA, USA (28 Feb 1983).

We have measured the centroids of high energy electromagnetic showers initiated by positrons in the energy range 2 to 17.5 GeV with a fine grained scintillation hodoscope composed of seven 1 cm wide elements placed behind a 3.6 radiation length (15 cm) converter composed of SCG1-C scintillation glass. A simple first moment calculation using the ionization observed in each element of this hodoscope yields a shower position resolution as a function of energy of: $\sigma(mm) \simeq 0.7 +- 5.6/\sqrt{E(GeV)}$. We present results on the energy dependence of the shower profiles and the ionization measured by this hodoscope.

54717 (LBL—15973, pp 111-112) **Scintillators and wave-shifters for fast scintillator-WSB calorimetry.** Theodosiou, G.E. (Univ. of Pennsylvania, Philadelphia). Apr 1983. NTIS, PC A09/MF A01. (CONF-830224—).

From DPF workshop on collider detectors: present capabilities and future possibilities; Berkeley, CA, USA (28 Feb 1983).

We discuss some properties of fast scintillators and wave-shifters, and their use and limitations in calorimetry using the wavelength shifter bar(WSB) readout technique.

54718 (LBL—15973, pp 113-114) **Scintillator calorimetry with vacuum photodiode readout.** Selove, W.; Theodosiou, G.E. (Univ. of Pennsylvania, Philadelphia). Apr 1983. NTIS, PC A09/MF A01. (CONF-830224—).

From DPF workshop on collider detectors: present capabilities and future possibilities; Berkeley, CA, USA (28 Feb 1983).

Vacuum Photodiodes (VPD) are discussed as a new readout technique for fast scintillator sampling calorimeters.

54719 (LBL—15973, pp 115-118) **Measurement of the response of an SCG1-C scintillation glass shower detector to 2-17.5 GeV positrons.** Cox, B. (Fermi National Accelerator Lab., Batavia, IL); Hale, G.; Mazur, P.O.; Wagner, R.L.; Wagoner, D.E.; Areti, H.; Conetti, S.; Lebrun, P.; Ryan, T.; Brau, J.E. Apr 1983. NTIS, PC A09/MF A01. (CONF-830224—).

From DPF workshop on collider detectors: present capabilities and future possibilities; Berkeley, CA, USA (28 Feb 1983).

We have measured the response of an electromagnetic shower counter constructed from the new scintillation glass (SCG1-C, Ohara Optical Glass, Inc.) to positrons in the energy range 2 to 17.5 GeV. We have measured the energy resolution of this 18.4 radiation length detector plus its attendant SF5 lead glass shower counter array to be $\sigma/E = (1.64 +- 0.14)\% + (1.13 +- 0.33)\%/\sqrt{}$ anti E with the constant term dominated by variations in the conversion point of the positron and shower leakage. We found this counter to be linear over the energy range examined. We have also measured the light output of the SCG1-C counter relative to light output of the SF5 lead glass guard blocks using 17.5 GeV positrons. We find that the SCG1-C counter produces 5.10 +- 0.30 more light at the phototype than the SF5 lead glass counters.

54720 (LBL—15973, pp 119-121) **Calorimetry at L = 10^{33}.** Selove, W.; Theodosiou, G. (Univ. of Pennsylvania, Philadelphia). Apr 1983. NTIS, PC A09/MF A01. (CONF-830224—).

From DPF workshop on collider detectors: present capabilities and future possibilities; Berkeley, CA, USA (28 Feb 1983).

We show that existing scintillation calorimetry techniques make operation at collision rates of 10^9/sec feasible for most rare events. Thus for pp colliders at $L = 10^{33}$, with DC operation, most such events will be analyzable. The question of possible misleading effects due to pile-up is discussed.

54721 (LBL—15973, pp 127-131) **Prospects for Cerenkov ring imaging at hadron colliders.** Goldberg, M. (Syracuse Univ., NY); Leith, D.W.G.S. Apr 1983. NTIS, PC A09/MF A01. (CONF-830224—).

From DPF workshop on collider detectors: present capabilities and future possibilities; Berkeley, CA, USA (28 Feb 1983).

The developing techniques of Cerenkov ring imaging detectors are reviewed, with emphasis on their performance in high luminosity environments.

54722 (LBL—15973, pp 134-136) **TOF for heavy stable particle identification.** Chang, C.Y. (Univ. of Maryland, College Park). Apr 1983. NTIS, PC A09/MF A01. (CONF-830224—).

From DPF workshop on collider detectors: present capabilities and future possibilities; Berkeley, CA, USA (28 Feb 1983).

Searching for heavy stable particle production in a new energy region of hadron-hadron collisions is of fundamental theoretical interest. Observation of such particles produced in high energy collisions would indicate the existence of stable heavy leptons or any massive hadronic system carrying new quantum numbers. Experimentally, evidence of its production has not been found for PP collisions either at FNAL or at the CERN ISR for $\sqrt{S}$ = 23 and 62 GeV respectively. However, many theories beyond the standard model do predict its existence on a mass scale ranging from 50 to a few hundred GeV. If so, it would make a high luminosity TeV collider an extremely ideal hunting ground for searching the production of such a speculated object. To measure the mass of a heavy stable charged particle, one usually uses its time of flight (TOF) and/or dE/dX information. For heavy neutral particle, one hopes it may decay at some later time after its production. Hence a pair of jets or a jet associated with a high P/sub t/ muon originated from some places other than the interacting point (IP) of the colliding beams may be a good signal. In this note, we examine the feasibility of TOF measurement on a heavy stable particle produced in PP collisions at $\sqrt{S}$ = 1 TeV and a luminosity of 10^{33} $cm^{-2}sec^{-1}$ with a single arm spectrometer pointing to the IP.

54723 (LBL—15973, pp 142) **Large solid angle solenoid spectrometer with particle identification by dE/dx.** Nygren, D.R. (Lawrence Berkeley Lab., CA). Apr 1983. NTIS, PC A09/MF A01. (CONF-830224—).

From DPF workshop on collider detectors: present capabilities and future possibilities; Berkeley, CA, USA (28 Feb 1983).

54724 (LBL—15973, pp 157-158) **Angular coverage of detectors.** Diebold, R. (Argonne National Lab., IL). Apr 1983. NTIS, PC A09/MF A01. (CONF-830224—).

From DPF workshop on collider detectors: present capabilities and future possibilities; Berkeley, CA, USA (28 Feb 1983).

Decay products from large p/sub T/ scatters and heavy particles will show up at large angles (more than a few degrees) and emphasis should be placed on this region when designing a general purpose 4π detector. In addition to optimizing the system for a fixed cost, this means that less space is required along the beam than might be first estimated by looking at the nominal rapidity range. Smaller angles can be covered with a crude detector to tag any events with significant p/sub T/ at angles less than that covered by the high-quality detector.

54725 (LBL—15973, pp 159-160) **Detector with a 3 T solenoid for a 10 TeV collider.** Kephart, R. (Fermi National Accelerator Lab., Batavia, IL); Tollestrup, A.; Mestayer, M. Apr 1983. NTIS, PC A09/MF A01. (CONF-830224—).

From DPF workshop on collider detectors: present capabilities and future possibilities; Berkeley, CA, USA (28 Feb 1983).

It has been frequently suggested that a long high field solenoid could be the basis for a high performance detector at a high luminosity machine. The properties of such a detector are explored for a 10 TeV collider using a 3 meter diameter superconducting solenoid with a 3 T field. It is concluded that very long high field solenoid is not a good candidate for a high energy, high luminosity detector, but that a somewhat shorter high field magnet with tracking chambers located outside the coil may give both good momentum resolution and easier pattern recognition than standard solenoids with tracking inside. (LEW)

54726 (LBL—15973, pp 161-162) **State of the art.** Lederman, L.M. (Fermi National Accelerator Lab., Batavia, IL). Apr 1983. NTIS, PC A09/MF A01. (CONF-830224—).

From DPF workshop on collider detectors: present capabilities and future possibilities; Berkeley, CA, USA (28 Feb 1983).

There is a large body of experience in high luminosity data taking in fixed target research. We try to consider a wide variety of high rate experiments which were limited by the detector (not by available beam) to a preset number of collisions per second. We then attempt to translate these state-of-the-art experiments to effective collider experiments. To this end, we extend the chosen detector to a comparison 4π collider detector operating near 1 TeV. There are several issues: (1) effective solid angle must be translated to $\simeq 4\pi$, (2) environments may be quite different, e.g., beam dump near fixed target or beam halo muons vs. collider backgrounds, (3) the multiplicity varies over the experiments selected and (4) we have to treat open vs closed geometries. The large variety of experiments selected is designed to average over the causes for detector limitation. Finally we chose detectors which have produced physics in order to gauge the state of the art.

54727 (LBL—15973, pp 163-168) **Experience with high luminosity running at the CERN ISR.** Linnemann, J.T. (Rockefeller Univ., New York, NY). Apr 1983. NTIS, PC A09/MF A01. (CONF-830224—).

From DPF workshop on collider detectors: present capabilities and future possibilities; Berkeley, CA, USA (28 Feb 1983).

Discussed is the experience of the CCOR and COR collaborations at the ISR at the steel low β intersection region, with luminosities up to 6×10^{31} $cm^{-2}s^{-1}$. In general, this luminosity level has caused only minor inconvenience for a detector covering polar angles 45 to 135 degrees in the center of mass, except for a special unrestrictive trigger on total transverse energy.

54728 (LBL—15973, pp 175-178) **Monte Carlo simulation of the effect of pileup.** Gordon, H.A.; Johnson, R.A.; Kahn, S.A.; Murtagh, M.J.; Weygand, D.P. (Brookhaven National Lab., Upton, NY). Apr 1983. NTIS, PC A09/MF A01. (CONF-830224—). Contract AC02-76CH00016.

From DPF workshop on collider detectors: present capabilities and future possibilities; Berkeley, CA, USA (28 Feb 1983).

A study of the effect of pileup on the trigger of either jet events or localized electromagnetic triggers is continued with the modification which allows soft jets to be generated above P/sub T/ = 1 GeV such that the integral of the two jet cross section equals the total inelastic cross section. Two other physics topics studied to assess the effect of pileup were: the effect of pileup for W-plus or minus physics and the effects of pileup on supersymmetric particle detection. (LEW)

54729 (LBL—15973, pp 179-184) **Calorimetric physics in the presence of multiple events.** Yoh, J. (Fermilab, Batavia, IL). Apr 1983. NTIS, PC A09/MF A01. (CONF-830224—).

From DPF workshop on collider detectors: present capabilities and future possibilities; Berkeley, CA, USA (28 Feb 1983).

Hadron colliders of the present and future generations will have to face the problem of having multiple events within the resolution time of the detector. A critical issue is the effect of multiple events on physics capabilities. This note addresses this issue.

54730 (LBL—15973, pp 185-191) **VIRTUS: a multi-processor event selector using FASTBUS.** Ellett, J. (Univ. of California, Los Angeles). Apr 1983. NTIS, PC A09/MF A01. (CONF-830224—).

From DPF workshop on collider detectors: present capabilities and future possibilities; Berkeley, CA, USA (28 Feb 1983).

This report describes a large, parallel array of M68000 microprocessors, designed with a throughput capacity of 10,000 events per second. FASTBUS segments interconnect the micro-

processors, the experiment data readout system, and the PDP-11 data acquisition system. A single M68000 receives the complete set of data for one event and processes the event independently of other events and other processors. FASTBUS provides the medium and the protocol for the efficient transfer of data-blocks to and from processors that become available in random order. Without modification, VIRTUS is also capable of being used off-line for full event analysis.

54731 **(NBL—307) Evaluation and calibration of a Los Alamos National Laboratory L/sub III/-edge densitometer.** McGonnagle, W.J.; Holland, M.K.; Reynolds, C.S.; Trahey, N.M.; Zook, A.C. (USDOE New Brunswick Lab., Argonne, IL). Jul 1983. 67p. NTIS, PC A04/MF A01. Order Number DE83018116.

The Department of Energy (DOE), New Brunswick Laboratory (NBL) has evaluated and calibrated an L/sub III/-edge densitometer for the Los Alamos National Laboratory. This prototype instrument was designed for nondestructive on-line measurement of uranium and/or plutonium solutions. The sensitivity was optimized for measuring the uranium and plutonium concentrations in mixed solutions typical of those produced by solvent extraction in the U-Pu fuel cycle. Foil assays were performed on a daily basis to monitor the measurement precision and the stability of the calibration. Traceable reference solutions prepared at NBL were used to calibrate and evaluate the system. For solutions containing approximately 50 grams of uranium and/or plutonium per liter, the relative standard deviation for the L-edge measurements was approximately 0.3%. This experimental evaluation demonstrated that the solution matrix did not influence the results. The instrument performance in a laboratory environment was excellent.

54732 **(PB—83-196766) Feasibility of development of a nuclear density gage for determining the density of plastic concrete at a particular stratum. Final report July 77-May 81.** Iddings, F.A.; Melancon, J.L. (Louisiana State Univ., Baton Rouge (USA)). May 1981. 93p. NTIS, PC A05/MF A01.

Development of a nuclear density gage for determining the degree of consolidation of plastic concrete in selected horizontal layers was determined to be feasible. A commercially available, with some modifications, two-probe density gage (detector in one and source in the other) provided the most reliable laboratory results and is practical for field use. A single probe backscatter gage designed to measure a vertical dimension of plastic concrete demonstrated poor stability and considerable difficulty in calibration. A horizontal scanning technique, measuring the density vertically from pavement edge to pavement edge, was studied and determined to be impractical for use. Densities of plastic concrete were taken on seven construction projects using the two-probe technique. Results are included in the report.

54733 **(PNCT—841-81-56) β rays dosimetry with stack type detectors in β and γ rays mixed fields.** Doke, T.; Kikuchi, J.; Kanamori, M.; Nakata, K. (Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan)). Jun 1981. 19p. (In Japanese). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703082.

β rays dosimetry in β and γ rays mixed fields are researched by using the stack type Silicon surface barrier detectors and plastic detectors. It is found that the dose of β rays and γ rays are detected separately by the stack type detectors.

54734 **(PNCT—841-81-57) Measurement of the radioactive aerosol diameter by position sensitive detectors, 3.** Murakami, H.; Nakamoto, A.; Kanamori, M.; Seki, A. (Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan)). Oct 1981. 22p. (In Japanese). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703090.

The measurement of the diameter of radioactive aerosol, in particular plutonium aerosol, is very important for the internal dose estimation. Determination of the diameter of radioactive aerosol is performed by using the position sensitive detectors. Position sensitive semiconductor detectors and Scintillation detectors with IIT tube are used as the position sensitive detector. The filter paper with the radioactive aerosols is contacted to the PSD which is connected to the data processor so that the diameter of the aerosol is calculated from the measured radioactivity.

54735 **(TU-Inf—05-01-81) Homogeneous TL dosemeter for direct reading of the biological radiation exposure in mixed neutron-gamma fields.** Fellinger, J.; Henniger, J.; Huebner, K. (Technische Univ., Dresden (German Democratic Republic). Sektion Physik). [nd]. 15p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703456.

A personnel TL neutron dosemeter for emergency use is described. It consists of hydrogenous radiators (on the top and at the bottom) and two hydrogenous layers with and without a Tl phosphor. The layers are used for reading. The dosemeter has been calibrated in different neutron-gamma fields. The linear measurement range was found to be within the limits of 0.05 to 100 Sv with an error of 5 per cent.

54736 **(TU-Inf—05-13-80) Physical fundamentals for evaluating neutron-irradiated solid-state track detectors by light transmission measurements.** Doerschel, B.; Gruellich, A. (Technische Univ., Dresden (German Democratic Republic). Sektion Physik). 1980. 9p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703457.

The light transmission method has been investigated with regard to its usefulness for evaluating solid-state track detectors. It is shown that with this method fast neutron-irradiated cellulose triacetate foils can be evaluated for neutron fluences ranging from $2x10^9$ to 10^{12} cm^{-2}. The biological neutron dose ranges from 10 to 5,000 rem. The detector response is presented graphically as a function of neutron fluence.

54737 **(TU-Inf—05-14-80) Device for evaluating solid-state track detectors by means of light transmission measurements.** Streubel, G.; Melde, C.; Gruellich, A. (Technische Univ., Dresden (German Democratic Republic). Sektion Physik). 1980. 12p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703458.

Design and performance are described of a device for evaluating neutron-irradiated organic solid-state track detectors (cellulose triacetate foils) based on the light transmission of the etched detector foil. Due to long-term stability and accuracy as well as to simple and quick handling the device is well suited for routine operation.

54738 **(TU-Inf—05-17-80) Calculation of the neutron sensitivity of thermoluminescent detectors. 1. Fundamentals.** Henniger, J.; Huebner, K. (Technische Univ., Dresden (German Democratic Republic). Sektion Physik). 1980. 12p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703459.

A method for calculating the sensitivity of thermoluminescent detectors in personnel neutron dosimetry is given. The interactions of primary neutrons with the thermoluminescent material, the secondary particles originating from the radiator, the gamma radiation due to (n,γ) reactions in the tissue, as well as interactions of albedo neutrons with the thermoluminescent material are taken in to account.

54739 **(TU-Inf—05-18-80) Calculation of the neutron sensitivity of thermoluminescent detectors. 2. Relative light conversion ratio for various thermoluminescent detectors as a function of the LET.** Huebner, K.; Henniger, J. (Technische Univ., Dresden (German Democratic Republic). Sektion Physik). 1980. 12p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703460.

For the thermoluminescent materials LiF, CaF_2, and $CaSO_4$ used in TL detectors the relative light conversion ratio is given as a function of the LET (1 to $5x10^3$ MeV/cm). The knowledge of the light conversion ratio is necessary for calculating the sensitivity of thermoluminescent detectors for neutrons detected by means of charged secondary particles.

54740 **(TU-Inf—05-19-80) Calculation of the neutron sensitivity of thermoluminescent detectors. 3. Sensitivity of radiator-detector combinations for fast neutrons.** Henniger, J.; Huebner, K. (Technische Univ., Dresden (German Democratic Republic). Sektion Physik). 1980. 16p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703461.

For increasing the fast neutron response in mixed neutron-gamma fields thermoluminescent detectors are combined with hydrogenous radiators (more than 8 mass percent hydrogen). The sensitivity of such combinations has been calculated for $CaSO_4$, CaF_2, and LiF taking into account the range of recoil protons (other secondary particles could be neglected) in the radiator and detector material, the angle scattering and the LET.

54741 **(TU-Inf—05-20-80) Calculation of the neutron sensitivity of thermoluminescent detectors. 4. Lithium fluoride albedo dosemeter.** Pretzsch, G. (Technische Univ., Dresden (German Democratic Republic). Sektion Physik). 1980. 11p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703462.

The neutron response has been calculated for a given albedo dosemeter consisting of LiF and teflon as thermoluminescent material and covered with a boron absorber for primary thermal neutrons. The sensitivity is defined as light yield per primarily incident neutron. The calculation model may be used for similar types of dosemeters.

54742 **(TU-Inf—05-21-80) Calibration of a special neutron dosemeter based on solid-state track detectors and fission radiators in various neutron fields.** Doerschel, B.; Krusche, M.; Schuricht, V. (Technische Univ., Dresden (German Democratic Republic). Sektion Physik). 1980. 16p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703463.

The calibration of a personnel neutron dosemeter in different neutron fields is described. The badge-like dosemeter contains 5 detectors: polycarbonate foil (10 μm, Makrofol KG), ^{232}Th, natural uranium, natural uranium with boron, and natural uranium with cadmium. Detector sensitivity and calibration factors have been calculated and measured in radiation fields of ^{252}Cf fission neutrons, WWR-S reactor neutrons with and without Cd and Fe shielding, 3-MeV (d,t) generator neutrons, and ^{238}PuBe neutrons. Measurement range and achievable accuracy are discussed from the point of view of applying the dosemeter in routine and emergency uses.

54743 **(TU-Inf—05-27-80) Study of the properties of cellulose triacetate foils used as solid-state track detectors for neutrons.** Pretzsch, G.; Doerschel, B. (Technische Univ., Dresden (German Democratic Republic). Sektion Physik). 1980. 11p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703464.

The properties of cellulose triacetate foils have been studied in connection with the use as solid-state track detectors for neutrons. For determining the sensitivity it is necessary to know the energy losses in the detector material, the track etching rate, and the angular dependence of the particle tracks. The critical energy loss for α particles was 160 KeV/μm, the mean etching rate of the α particle tracks was 12.5 μm/h, and the critical value of the angle between the detector surface and the α particle tracks was 32.2°. The registration probability of neutron-induced α particles from the LiF radiator was 0.68.

54744 **(TU-Inf—05-28-80) Multi-channel spark counter for reading neutron dosemeters with plastic track detectors.** Doerschel, B.; Krusche, M.; Melde, C. (Technische Univ., Dresden (German Democratic Republic). Sektion Physik). 1980. 12p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703465.

Design, function, and operational instructions are given of a spark counter for reading neutron dosemeters with solid-state track detectors (polycarbonate foils). Taking into account calibration and weighting factors the biological neutron dose is given automatically by a computer.

54745 **(TU-Inf—05-29-80) Model for calculating the neutron sensitivity of organic solid-state track detectors.** Pretzsch, G.; Faehrmann, M. (Technische Univ., Dresden (German Democratic Republic). Sektion Physik). 1980. 12p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703466.

The model proposed allows to calculate the etch pit distribution according to diameter and depth. Starting with the determination of the spectra of charged particles originating in the detector by neutron-induced nuclear reactions and with assessing particle characteristics (e.g. range) the latent tracks have been tested with regard to their etchability. The etching process has been simulated on the assumption that the detector is homogeneous and isotropic. The sensitivity is calculable for different neutron energies, incident angles, neutron fluences, detector materials as well as etching conditions. Results calculated for neutrons with normal incidence, cellulose triacetate as detector material, and light microscopy evaluation are compared with measured data.

54746 **Response of an area albedo neutron dosimeter.** Gupta, V.P. (Idaho National Engineering Lab., Idaho Falls). *Health Physics;* **45**: No. 1, 158-162(Jul 1983).

An albedo neutron dosimeter (AND) worn by radiation workers measures the flux of thermal neutrons that leave the human body when a person is exposed to fast neutrons. If such a dosimeter is used as a neutron area monitor, it must be mounted on a suitable phantom. In this paper, an area albedo neutron dosimeter (AAND) is described. This AAND is presently used at the Idaho National Engineering Laboratory (INEL) and the Bendix Field Engineering Corporation at Grand Junction. The response of the AAND to different neutron spectra is examined when it is exposed free in air or against concrete block walls. (KRM)

54747 **α-β-γ spectrometer for directing decontamination of soils.** Berger, C.D. (Oak Ridge National Lab., TN). *Health Physics;* **44**: No. 6, 684-688(Jun 1983). Contract W-7405-ENG-26.

The α-β-γ spectrometry system described in this report permits rapid assessment of particulate and photo-emitter contamination in soils at sufficiently low concentrations to direct initial field decommissioning and decontamination operations. Of particular importance is its applicability during initial surveys when characterization of alpha and beta contamination in the presence of a high γ-background is necessary. At the time this report was written, a portable system for in situ use had not yet been developed. Increasing the detector size, as well as streamlining and ruggedizing the associated electronics should result in a sensitive field instrument for simplification of standard decontamination operations for soils and other surfaces.

54748 **Variable geometry high-purity germanium detector telescope system for use with intermediate energy charged particles.** Friesel, D.L.; Flanders, B.S. (Indiana Univ., Bloomington (USA). Cyclotron Facility); Pehl, R.H. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.). *Nuclear Instruments and Methods in Physics Research;* **207**: No. 3, 403-415(1 Apr 1983).

With 16 figs. and 2 tabs.

A versatile variable geometry detector telescope system consisting of silicon surface barrier and high-purity germanium planar detectors has been developed and used at intermediate light ion energies at IUCF for several years. Detailed descriptions of the telescope system and its operational properties are given. The practical experiences of using detectors fabricated from both n- and p-type high-purity germanium for a variety of particles and energies are described along with details of the effects of long-term storage, radiation damage, and radiation damage annealing procedures on detector properties. Diffusion of the Li n^+ contact after many radiation damage and anneal cycles is also discussed.

54749 **Glow-curve analysis for verification of dose in LiF chips.** Hoots, S.S.; Landrum, V. (California Univ., Livermore (USA). Lawrence Livermore National Lab.). *Health Physics;* **43**: No. 6, 905-912(Dec 1982).

It is useful to print and save thermoluminescent dosimetry glow curves as a permanent record for re-evaluation in, for example, court cases implicating occupational radiation doses. Differences in glow curves, for an analysis of employee dose, were investigated. Effects on glow curves from ionizing and non-ionizing radiations and external contaminants, such as chalk, soap and dust, were considered and the shape of glow curves studied. The shape of the glow curve is an indication of the correct functioning of a thermoluminescent dosemeter.

54750 **Tritium monitor with improved gamma-ray discrimination.** Cox, S.A.; Bennett, E.F.; Yule, T.J. US Patent Application 6-435,795. 21 Oct 1982. 22p. Contract W-31-109-ENG-38.

Apparatus and method are presented for selective measurement of tritium oxide in an environment which may include other radioactive components and gamma radiation, the measurement including the selective separation of tritium oxide from a sample gas through a membrane into a counting gas, the generation of electrical pulses individually representative by rise times of tritium oxide and other radioactivity in the counting gas, separation of the pulses by rise times, and counting of those pulses representative of tritium oxide. The invention further includes the separate measurement of any tritium in the sample gas by oxidizing the tritium to tritium oxide and carrying out a second separation and analysis procedure as described above.

54751 **Doppler-broadening lineshape parameter standard.** Koegel, G.; Triftshaeuser, W. (Hochschule der Bundeswehr Muenchen, Neubiberg, F.R. Germany); Smedskjaer, L. (Argonne National Lab., IL (USA)). pp 903-905 of Positron annihilation. Proceedings of the sixth international conference held at The University of Texas at Arlington, April 3-7, 1982. Coleman, P.G.; Sharma, S.C.; Diana, L.M. (Texas Univ., Arlington (USA). Center for Positron Studies) (eds.). Amsterdam, Netherlands; North-Holland (1982). (CONF-820434—).

From 6. international conference on positron annihilation; Arlington, TX, USA (3 Apr 1982).

A new scheme is introduced for the determination of lineshape parameters from Doppler-broadened annihilation spectra. The evaluation of this generalized lineshape parameter from the observed Doppler profile is equivalent to an integration over the true Doppler-broadened energy distribution multiplied by a standard weight function. Therefore, this lineshape parameter is independent of the resolution function of the γ-detector used. For the standard weight function a Gaussian function with a standard deviation of 0.75 keV is proposed.

54752 **Dynamic positron emission tomography in man using small bismuth germanate crystals.** Derenzo, S.E.; Budinger, T.F.; Huesman, R.H.; Cahoon, J.L. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.). pp 935-945 of Positron annihilation. Proceedings of the sixth international conference held at The University of Texas at Arlington, April 3-7, 1982. Coleman, P.G.; Sharma, S.C.; Diana, L.M. (Texas Univ., Arlington (USA). Center for Positron Studies) (eds.). Amsterdam, Netherlands; North-Holland (1982). (CONF-820434—).

From 6. international conference on positron annihilation; Arlington, TX, USA (3 Apr 1982).

Primary considerations for the design of positron emission tomographs for medical studies in humans are the need for high imaging sensitivity, whole organ coverage, good spatial resolution, high maximum data rates, adequate spatial sampling with minimum mechanical motion, shielding against out of plane activity, pulse height discrimination against scattered photons, and timing discrimination against accidental coincidences. The choice of detectors, sampling motion, shielding, and electronics to meet these objectives is discussed.

54753 **(UCRL-Trans—11876) Simultaneous spectral measurement of fast neutrons and rays with an organic scintillator.** Shin, K. Translated from *Hoshasen ;* 8: No. 1, 41-52(Jun 1981). Contract W-7405-ENG-48. 19p. NTIS, PC A02/MF A01. Order Number DE83015279.

Portions are illegible in microfiche products.

As was mentioned above, research and development on organic scintillators, particularly NE-213 scintillators, as spectrometers for measuring neutrons and γ rays simultaneously with improved nγ separation functions, is continuing. With the exception of special cases, sufficiently accurate measurements have been obtained. Of the problems that remain today, the most important one is the applicability to areas where a large peak is present in the spectrum. It is necessary to vastly improve the accuracy of the response function. Furthermore, tests on the response of high energy neutrons are necessary in order to expand the neutron measurement range to high energy regions. Measurements on several MeV ray spectra, such as γ ray spectra are still insufficient, because the γ ray response is incorrect.

4402 Radiation Effects On Instrument Components, Instruments, Or Electronic Systems

54754 **(AD-A—127139/4) Evaluation of AURORA as a tactical source region simulation. Contractor report.** Crevier, W.F.; Kalasky, E.D.; Scharf, W. (Mission Research Corp., Santa Barbara, CA (USA)). Feb 1983. 67p. NTIS, PC A04/MF A01.

This memo compares the AURORA environment with that expected in an actual tactical source region environment. The primary interest in making the comparison is to evaluate the role that AURORA can play as a source region simulator for tactical systems of interest to the U.S. Army Comparisons are made between the electric and magnetic fields measured in AURORA and those computed using a four source model of AUR3D. Excellent agreement is found in the comparison between the magnetic fields. The computed electric fields show a fundamentally different behavior from those measured in AURORA.

54755 **(AD-A—127303/6) Calculation of late-time surface burst EMP (electromagnetic pulse) fields using a time-independent numerical method. Master's thesis.** Downey, J.R. (Air Force Inst. of Tech., Wright-Patterson AFB, OH (USA). School of Engineering). Mar 1983. 151p. (AFIT/GNE/PH—83M-5). NTIS, PC A08/MF A01.

A numerical solution was developed to find the quasi-static EMP fields resulting from a surface nuclear burst. By ignoring the time derivatives in Maxwell's equations and expanding the electrostatic potential in Legendre polynomials, a set of differential equations was obtained that was dependent on r only (r = radius from burst). By employing finite difference, a tri-diagonal matrix equation was obtained that was on-linear in the electric field. This equation was solved using an iterative scheme. Analytic curve fits based on Monte Carlo data were used to determine the air ionization rate and Compton current. This permitted the angular variation of these sources to be included in the calculations. In addition, the electron air chemistry parameters were allowed to vary with the local electric field and water vapor content of the air. This was accomplished by the use of previously developed equations for these terms. Field calculations were made and compared to previous analytic results. The differences were found to be as great as 50 percent for peak field values. A limited parametric study was performed to consider the effects of varying the time, the yield, and the water vapor content.

54756 **(AD-A—127379/6) Techniques for source-region EMP experiments at AURORA. Contractor report.** van Lint, V.A.J.; Scharf, W. (Mission Research Corp., Santa Barbara, CA (USA)). Feb 1983. 34p. NTIS, PC A03/MF A01.

This memo describes reliable measurement techniques for determining source-region EMP parameters in the AURORA room. The general principles involved in each measurement, the interference effects, and specific design considerations for the AURORA environment are discussed. These measurements include the determination of the electromagnetic fields, the current densities, the air conductivity and the induced currents on a conductor. The interference effects, as they relate to each of these measurements, occurring from Compton transfer currents, ionization-induced conduction, shield currents and photo-induced cable currents are also discussed.

54757 **(AD-A—130141/5) Physical and computer modeling of military earth grounding practices in a HEMP (high-altitude electromagnetic pulse) environment. Technical memo.** Cuneo, A.A. Jr.; Loftus, J.J.; Perala, R.A. (Harry Diamond Labs., Washington, DC (USA)). Jun 1983. 22p. (HDL-TM—83-6). NTIS, PC A02/MF A01.

Military grounding practices compatible with hardening electronic systems to high-altitude electromagnetic pulse (HEMP) illumination are considered. This study concerns the grounding practices outlined in MIL-STD-188-124, Common Long-Haul/Tactical Communications Systems. Three standard grounding schemes and one new scheme were chosen for study at a 10:1 scale, illuminated by a 59-V/m peak simulated HEMP. There were several significant results: (a) The theoretical technique in general agrees to within a factor of three with the experimental results, (b) The type end of earth ground system does not appear to be important, and (c) Intrasite transients tend to be dominated by electromagnetic coupling to completed conductive loops. When the loop is broken, the transient is characterized by the half-wavelength resonance of the conductor. Grounding paths which do not form part of the loop do not contribute significantly to the transient in the loop.

54758 (ARL/TR—050, pp 16) **Effect of ultraviolet and visible radiation on the readout obtained from γ-irradiated and unirradiated $CaSO_4$:Dy in teflon discs.** Bartnik, D.L.; Calvert, R.L.; Young, J.G. Jan 1983. NTIS (US Sales Only), PC A08/MF A01.

In Annual review of research projects 1981.

The effect of ultraviolet and visible radiation on the readout obtained from the main dosimetry peak of $CaSO_4$:Dy in teflon discs is explained by the net result of an inherent response, a photo-transfer and an optical bleaching.

54759 **(JPL-PUB—81-66-Vol.1) Total-dose radiation-effects data for semiconductor devices. Vol. 1.** Price, W.E.; Martin, K.E.; Nichols, D.K.; Gauthier, M.K.; Brown, S.F. (Jet Propulsion Lab., Pasadena, CA (USA)). 1 Aug 1981. 192p. NTIS, PC A09/MF A01. Order Number DE83902813.

Portions are illegible in microfiche products.

This document provides steady-state, total-dose radiation-test data, in graphic format, for use by electronic designers and other personnel using semiconductor devices in a radiation environment. The data were generated by JPL for various NASA space programs. The document is in two volumes. Volume I provides data on diodes, bipolar transistors, field effect transistors, and miscellaneous semiconductor types. Volume II provides data on integrated circuits.

54760 **(JPL-PUB—81-66-Vol.2) Total-dose radiation-effects data for semiconductor devices. Vol. 2.** Price, W.E.; Martin, K.E.; Nichols, D.K.; Gauthier, M.K.; Brown, S.F. (Jet Propulsion Lab., Pasadena, CA (USA)). 1 Dec 1981. 320p. NTIS, PC A15/MF A01. Order Number DE83902814.

Portions are illegible in microfiche products.

This document is part two of a three-volume set. Volume I provides total ionizing-dose radiation-test data on diodes, bipolar transistors, field-effect transistors, and miscellaneous discrete solid-state devices. Volume II provides similar data on integrated circuits. Volume III provides a detailed analysis of the data from Volumes I and II. Volume III will be released during 1982. The data presented here are presented in graphic, tabular, or narrative format, depending on the complexity of the integrated circuit. Most of the tests were done using the JPL or Boeing electron accelerator (Dynamitron) that provides a steady-state 2.5-MeV electron beam. However, some radiation exposures were made with a Cobalt-60 gamma ray source. The results obtained with the Cobalt-60 source should be regarded as only an approximate measure of the radiation damage that would be incurred by an equivalent dose of electrons. All data were generated in support of NASA space programs by the JPL Radiation Effects and Testing Group (514).

4403 Miscellaneous Instruments

REFER ALSO TO CITATION(S) 53362, 53363, 54048, 54294, 54913, 54978

54761 **(JINR—E-13-82-639) "Lidia" ultrasensitive mass spectrometer.** Ter-Akopyan, G.M.; Arzumanyan, G.M.; Bogdanov, D.D.; Bykovski, Yu.A.; Kozlovski, Z.; Rodin, A.M.; Silnov, S.M.; Stepantsov, S.V.; Flerov, G.N. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions). 1982. 4p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703573.

An ultrasensitive mass spectrometer using a laser ion source has been designed to seach for superheavy elements ($A > 250$). A mass spectrometer consists of a laser ion source, a vapour or gas target, with the subsequent selection of the ions that have undergone charge exchange, and a multi-stage separation system to lower the background. It has been shown that it is possible to build a device with relative and absolute sensitivities of respectively 10^{-13}-10^{-14} at/at and 10^6 atoms for analysis duration of 3 hours.

54762 **(KIYI—81-41) Scheme of stepmotor control.** Grashilin, V.A.; Karyshev, Yu.Ya. (AN Ukrainskoj SSR, Kiev. Inst. Yadernykh Issledovanij). 1982. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703086.

A 6-cycle scheme of step motor is described. The block-diagram and the basic circuit of the step motor control are presented. The step motor control comprises a pulse shaper, electronic commutator and power amplifiers. The step motor supply from 6-cycle electronic commutator provides for higher reliability and accuracy than from 3-cycle commutator. The control of step motor work is realised by the program given by the external source of control signals. Time-dependent diagrams for step motor control are presented. The specifications of the step-motor is given.

54763 **(LA-UR—83-2291) VISAR: some things you should know.** Hemsing, W.F. (Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. 6p. (CONF-830874—18). NTIS, PC A02/MF A01. Order Number DE83017606.

From 27. annual international technical symposium on high speed photography, videography and photonics; San Diego, CA, USA (21 Aug 1983).

VISAR performance can be improved while reducing cost, set up time, and required operator skill. Simple features that increase laser light efficiency, improve signal-to-noise ratio, reduce the number of data channels, greatly simplify data reduction, ease VISAR adjustments, and reduce laser wear and tear are discussed. These features were collected, developed, tried, and proven over the last few years and several hundred VISAR shots.

54764 **(LBL—15646-Rev.) Specific heat of ^{3}He in the Fermi-liquid region.** Mayberry, M.C.; Fogle, W.E.; Phillips, N.E. (Lawrence Berkeley Lab., CA (USA)). Apr 1983. Contract AC03-76SF00098. 12p. (CONF-830456—3-Rev.). NTIS, PC A02/MF A01. Order Number DE83014858.

From Symposium on quantum fluids and solids; Sanibel Island, FL, USA (11 Apr 1983).

A CMN thermometer has been calibrated by nuclear orientation thermometry at low temperatures and by He vapor pressure thermometry at high temperatures. The calibration agrees well with the NBS temperature scale between 100 and 200 mK. Specific heat data on ^{3}He in the Fermi liquid region obtained with this thermometer are in good agreement with recent measurements at Bell Laboratories. It is argued that discrepancies with other data arise from differences in the underlying temperature scales.

54765 **(LBL—15918-Rev.) Fast, self-nulling spectroscopic ellipsometer: instrumentation and application. Revision.** Muller, R.H.; Farmer, J.C. (Lawrence Berkeley Lab., CA (USA)). May 1983. Contract AC03-76SF00098. 15p. (CONF-8306116—1-Rev.). NTIS, PC A02/MF A01. Order Number DE83015531.

From Conference on ellipsometry and other optical methods for surface and thin film analysis; Paris, France (7 Jun 1983).

The advantages of rapid spectral scanning have been combined with the inherent accuracy of a compensating ellipsometer operated in the polarizer-compensator-sample-analyzer configuration. Wavelength is varied over the visible-uv (370 to 720 nm) at a maximum rate of 114 nm/s by rotating a continuously-variable interference filter. A three-reflection Fresnel rhomb serves as the achromatic quarter-wave compensator. A microcomputer is used to collect spectroscopic measurements, perform instrument calibrations, digital filtering and interpret data. Wavelength-independent parameters of multiple-film optical models have been determined by treating measurements of delta and psi at different wavelengths as independent measurements. Experimental and predicted ellipsometer measurements are compared by use of statistical techniques for the determination of optimum values and confidence limits of model parameters.

54766 **(LBL—16031) Proceedings of the seventh international conference on high voltage electron microscopy.** Fisher, R.M.; Gronsky, R.; Westmacott, K.H. (eds.). (Lawrence Berkeley Lab., CA (USA)). 1983. Contract AC03-76SF00098. 442p. (CONF-830819—). NTIS, PC A19/MF A01. Order Number DE83016323.

From 7. international conference on high voltage microscopy; Berkeley, CA, USA (16 Aug 1983).

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Eight-four papers are arranged under the following headings: high resolution, techniques and instrumentation, radiation effects, in-situ and phase transformations, minerals and ceramics, and semiconductors and thin films. Twenty-three papers were abstracted separately for the data base; three of the remainder had previously been abstracted. (DLC)

54767 (LBL—16031, pp 107-110) **Dynamic recording system for HVEM in situ studies.** Kenik, E.A. (Oak Ridge National Lab., TN). 1983. NTIS, PC A19/MF A01. (CONF-830819—). Contract W-7405-ENG-26.

From 7. international conference on high voltage microscopy; Berkeley, CA, USA (16 Aug 1983).

In many high-voltage electron microscope (HVEM) in situ studies, such as those dealing with deformation or gas-solid reactions, the microstructural changes of interest occur too rapidly to be recorded by the standard plate camera and possibly even to be observed visually. Conventional still photography does not lend itself to represent the dynamic nature of these processes or to document the continuous microstructural evolution involved. A dynamic recording system based on a low-light-level television (LLLTV) camera/videotape recorder (VTR) is under development for the ORNL Hitachi HU-1000 HVEM.

54768 **(SAND—83-0263) Transient response of circular-foil heat-flux gages.** Grothus, M.A.; Mulholland, G.P.; H"ls, R.G.; Marshall, B.W. (New Mexico State Univ., Las Cruces (USA); Sandia National Labs., Albuquerque, NM (USA)). Jul 1983. Contract AC04-76DP00789. 188p. NTIS MF A01. Order Number DE83017785.

Microfiche only, copy does not permit paper copy reproduction. Original copy available until stock is exhausted.

The objective of this study was to develop relationships that describe the transient response of circular foil heat-flux gages. Prediction of the gage surface flux for non-steady-state conditions based on the measured temperature response of the gage is achieved through application of a numerical deconvolution method. Sensitivity and uncertainty analyses were conducted to examine which gage parameters have the greatest effect on the determination of heat flux; these included the foil thermophysical properties, thickness, and maximum radius.

54769 **(SAND—83-0959C) Piezometer-probe technology for geotechnical investigations in coastal and deep-ocean environments.** Bennett, R.H.; Burns, J.T.; Lipkin, J.; Percival, C.M. (Naval Ocean Research and Development Activity, NSTL, MS (USA); Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 28p. (CONF-830639—6). NTIS, PC A03/MF A01. Order Number DE83017482.

From 12. transducer workshop; Melbourne, FL, USA (7 Jun 1983).

Portions are illegible in microfiche products.

Three multisensor piezometer probes were developed and field tested for use in coastal (shallow water) fine-grained Marine soils. Offshore sites were investigated in the Mississippi Delta. Pore water pressure measurements were determined at several depths below the sea floor using both absolute and differential pressure sensors placed in a four inch diameter probe. Pressure sensors were hard-wired to nearby platforms where signals were conditioned and analog recording devices monitored pore water pressure changes in the marine soils. Pore water pressures were monitored for several months. Two single sensor piezometer probes, eight millimeters in diameter, were developed for deep-ocean investigations. These probes use differential pressure sensors and were tested in a hyperbaric chamber pressurized to 55 MPa (8000 psi). Testing was performed for a period of five weeks under high hydrostatic pressure with the probes inserted in reconstituted illitic marine soil. Small differential pore water pressures responded to both mechanically and thermally generated forcing functions. During shallow water investigations and simulated deep-ocean pressure tests, the sensors exhibited excellent sensitivity and stability. These developments in piezometer probe technology provide a means of assessing important geotechnical parameters of fine-grained seabed deposits.

54770 **(SAND—83-8025) Gauge block lasometer development.** Pilkey, R.D. (Sandia National Labs., Livermore, CA (USA)). Sep 1983. Contract AC04-76DP00789. 17p. NTIS, PC A02/MF A01. Order Number DE83018288.

Automated dimensional measurement and calibration systems require gauging apparatus capable of transferring measurement data to appropriate computing devices. This report describes how a formerly obsolete dimensional measuring instrument was upgraded to interface with a desktop computer, thereby giving it current technological capability.

54771 **(UCRL—89776) Deposition of cesium iodide on parylene.** Tassano, P.L. (Lawrence Livermore National Lab., CA (USA)). 31 Aug 1983. Contract W-7405-ENG-48. 9p. (CONF-8309141—1). NTIS, PC A02/MF A01. Order Number DE83017839.

From International Nuclear Target Development Society conference; Eastsound, WA, USA (7 Sep 1983).

This paper describes a technique we developed for coating thin Parylene with thin films of cesium iodide and presents results obtained in a comparative evaluation of these films with commercially produced films.

54772 **Sonic resonator control and method for determining component concentration in multiple-component liquid.** Shen, S.Y. US Patent Application 6-437,783. 29 Oct 1982. 19p. Contract W-31-109-ENG-38.

This invention teaches a control to be used in smelting aluminum by the electrolysis breakdown of alumina (Al_2O_3) in a molten electrolyte heated to approximately 950 to 1000°C. The invention provides a sonic resonator and control that can accurately detect the resonant frequency of the resonator in the molten electrolyte. The resonator preferably is made with tubular side wall 1/4 of the sonic wavelength, or is a quarter wave resonator. A wave generator inputs a signal having a range of frequencies that includes the resonant frequency, so that a peak resonant output at the resonant frequency can be detected on an oscilloscope or like detector. This instantaneous resonant frequency is then checked against an accurate data base correlating the resonant frequencies of the resonator in the electrolyte at specific alumina concentrations normally experienced throughout the electrolysis cycle. The electrolysis cycle can thus be controlled and recharged at any predetermined low alumina concentration greater than where the anode effect phase of the cycle normally might begin.

54773 **Precision absolute-value amplifier for a precision voltmeter.** Hearn, W.E.; Rondeau, D.J. US Patent Application 6-435,157. 19 Oct 1982. 31p. Contract AC03-76SF00098.

Bipolar inputs are afforded by the plus inputs of first and second differential input amplifiers. A first gain determining resistor

is connected between the minus inputs of the differential amplifiers. First and second diodes are connected between the respective minus inputs and the respective outputs of the differential amplifiers. First and second FETs have their gates connected to the outputs of the amplifiers, while their respective source and drain circuits are connected between the respective minus inputs and an output lead extending to a load resistor. The output current through the load resistor is proportional to the absolute value of the input voltage difference between the bipolar input terminals. A third differential amplifier has its plus input terminal connected to the load resistor. A second gain determining resistor is connected between the minus input of the third differential amplifier and a voltage source. A third FET has its gate connected to the output of the third amplifier. The source and drain circuit of the third transistor is connected between the minus input of the third amplifier and a voltage-frequency converter, constituting an output device. A polarity detector is also provided, comprising a pair of transistors having their inputs connected to the outputs of the first and second differential amplifiers. The outputs of the polarity detector are connected to gates which switch the output of the voltage-frequency converter between up and down counting outputs.

54774 **Method and apparatus for determining fluid mass flowrates.** Hamel, W.R. US Patent Application 6-433,299. 7 Oct 1982. 17p. Contract W-7405-ENG-26.

This invention relates to a new method and new apparatus for determining fluid mass flowrate and density. In one aspect of the invention, the fluid is passed through a straight cantilevered tube in which transient oscillation has been induced, thus generating Coriolis damping forces on the tube. The decay rate and frequency of the resulting damped oscillation are measured, and the fluid mass flowrate and density are determined therefrom. In another aspect of the invention, the fluid is passed through the cantilevered tube while an electrically powered device imparts steady-state harmonic excitation to the tube. This generates Coriolis tube-damping forces which are dependent on the mass flowrate of the fluid. Means are provided to respond to incipient flow-induced changes in the amplitude of vibration by changing the power input to the excitation device as required to sustain the original amplitude of vibration. The fluid mass flowrate and density are determined from the required bending of the fluid flow.

54775 **Acoustic-velocity measurements in materials using a regenerative method.** Laine, E.F. US Patent Application 6-429,920. 30 Sep 1982. 17p. Contract W-7405-ENG-48.

Portions are illegible in microfiche products.

Acoustic energy is propatated through earth material between an electro-acoustic generator and a receiver which converts the received acoustic energy into electrical signals. A closed loop is formed by a variable gain amplifier system connected between the receiver and the generator. The gain of the amplifier system is increased until sustained oscillations are produced in the closed loop. The frequency of the oscillations is measured as an indication of the acoustic propagation velocity through the earth material. The amplifier gain is measured as an indication of the acoustic attenuation through the earth materials. The method is also applicable to the non-destructive testing of structural materials, such as steel, aluminum and concrete.

54776 **Pressure-sensitive optrode.** Hirschfeld, T.B. US Patent Application 6-430,578. 30 Sep 1982. 22p. Contract W-7405-ENG-48.

Apparatus and method for sensing changes in pressure and for generating optical signals related to changes in pressure. Light from a fiber optic is directed to a movable surface which is coated with a light-responsive material, and which moves relative to the end of the fiber optic in response to changes in pressure. The same fiber optic collects a portion of the reflected or emitted light from the movable surface. Changes in pressure are determined by measuring changes in the amount of light collected.

54777 **Precision manometer gauge.** McPherson, M.J.; Bellman, R.A. US Patent Application 6-425,144. 27 Sep 1982. 14p. Contract W-7405-ENG-48.

A precision manometer gauge which locates a zero height and a measured height of liquid using an open tube in communication with a reservoir adapted to receive the pressure to be measured. The open tube has a reference section carried on a positioning plate which is moved vertically with machine tool precision. Double scales are provided to read the height of the positioning plate accurately, the reference section being inclined for accurate meniscus adjustment, and means being provided to accurately locate a zero or reference position.

54778 **Bandpass x-ray diode and x-ray multiplier detector.** Wang, C.L. US Patent Application 6-425,140. 27 Sep 1982. 24p. Contract W-7405-ENG-48.

An absorption-edge of an x-ray absorption filter and a quantum jump of a photocathode determine the bandpass characteristics of an x-ray diode detector. An anode, which collects the photoelectrons emitted by the photocathode, has enhanced amplification provided by photoelectron-multiplying means which include dynodes or a microchannel-plate electron-multiplier. Suppression of undesired high frequency response for a bandpass x-ray diode is provided by subtracting a signal representative of energies above the passband from a signal representative of the overall response of the bandpass diode.

54779 **Double resonator cantilever accelerometer.** Koehler, D.R. US Patent Application 6-422,515. 23 Sep 1982. 15p. Contract AC04-76DP00789.

A digital quartz accelerometer includes a pair of spaced double-ended tuning forks fastened at one end to a base and at the other end through a spacer mass. Transverse movement of the resonator members stresses one and compresses the other, providing a differential frequency output which is indicative of acceleration.

54780 **Time-of-flight mass spectrometer.** Ulbricht, W.H. Jr. US Patent Application 6-414,745. 3 Sep 1982. 17p.

A time-of-flight mass spectrometer is described in which ions are desorbed from a sample by nuclear fission fragments, such that desorption occurs at the surface of the sample impinged upon by the fission fragments. This configuration allows for the sample to be of any thickness, and eliminates the need for complicated ample preparation.

4404 Well Logging Instrumentation

REFER ALSO TO CITATION(S) 53431, 53436

54781 **(GJBX—28(83)) Model for water factor measurements with fission-neutron logging tools. National Uranium Resource Evaluation.** Koizumi, C.J. (Bendix Field Engineering Corp., Grand Junction, CO (USA). Grand Junction Operations). May 1983. Contract AC13-76GJ01664. 42p. NTIS, PC E03/MF A01. Order Number DE83017525.

Includes 2 sheets of 24x reduction microfiche.

During 1977 and 1978, a Fission Neutron Water Factor Model was designed and constructed by Bendix Field Engineering Corporation (BFEC) for the United States Department of Energy (DOE) at the Grand Junction facility. This model features seven water-filled boreholes with different diameters. All of these boreholes penetrate, in order from the top of the model, a 5-foot-thick (1.52 m), uniform, concrete upper "barren zone"; a 6-foot-thick (1.83 m), uniform, uranium-enriched, concrete "ore zone"; and a 4-foot-thick (1.22 m), uniform, concrete lower "barren zone". The response of a fission neutron logging tool in a water-filled borehole is affected by variations in the borehole diameter. This diameter-dependent effect can be deduced from logs run in several different boreholes of the Fission Neutron Water Factor Model. This report describes the construction of the Fission Neutron Water Factor Model and also presents values for model parameters which are of interest in fission-neutron logging.

54782 **Down-hole periodic seismic generator.** Hardee, H.C.; Hills, R.G.; Striker, R.P. US Patent Application 6-437,404. 28 Oct 1982. 28p. Contract AC04-76DP00789.

A down hole periodic seismic generator system is disclosed for transmitting variable frequency, predominantly shear-wave vibration into earth strata surrounding a borehole. The system com-

prises a unitary housing operably connected to a well head by support and electrical cabling and contains clamping apparatus for selectively clamping the housing to the walls of the borehole. The system further comprises a variable speed pneumatic oscillator and a self-contained pneumatic reservoir for producing a frequency-swept seismic output over a discrete frequency range.

54783 **High-voltage supply for neutron tubes in well-logging applications.** Humphreys, D.R. US Patent Application 6-418,150. 15 Sep 1982. 19p. Contract AC04-76DP00789.

A high voltage supply is provided for a neutron tube used in well logging. The biased pulse supply of the invention combines DC and full pulse techniques and produces a target voltage comprising a substantial negative DC bias component on which is superimposed a pulse whose negative peak provides the desired negative voltage level for the neutron tube. The target voltage is preferably generated using voltage doubling techniques and employing a voltage source which generates bipolar pulse pairs having an amplitude corresponding to the DC bias level.

45 EXPLOSIONS AND EXPLOSIVES

4501 Chemical

54784 **(AD-A—128715/0) Ir spectral signatures of the millrace debris cloud. Technical report.** Giguere, R.P.; Jones, D.A.; Kayser, D.C.; Rice, C.J.; Russell, R.W. (Aerospace Corp., El Segundo, CA (USA). Space Sciences Lab.). 20 Apr 1983. 59p. (TR—0083(3940-03)-1). NTIS, PC A04/MF A01.

Infrared radiation scattered by the dust and debris cloud generated by the detonation of 600 tons of Ammonium Nitrate/Fuel Oil (ANFO) high explosive for the MILLRACE test on 16 September 1981 was measured by an infrared spectrometer from a Learjet. The observations were made to characterize the signature of dust/dirt clouds and to compare such observations with similar measurements of naturally-occurring water clouds. The instrument used a circular variable interference filter in the spectral interval from 1.8 to 3.4 micrometer to continuously scan solar radiation scattered by clouds. A total of 76 minutes of data was collected beginning with detonation. The cloud reached a stabilization altitude fo 4.4 km MSL (2.9 km AGL). The Learjet flight plan was structured to permit characterizing the scattered radiation as a function of wavelength, scattering angle, and time from detonation. Scattering angles from about 50 to 180 deg were sampled. The expected increase in scattered flux at smaller scattering angles was observed; the wavelength dependence of this effect has not yet been fully determined. Cumulus clouds present in the area were also observed. When compared with measurements and calculations for water clouds, the radiation scattered from the dust cloud exhibits higher relative intensity in the wavelength region beyond 3.0 micrometer.

54785 **(CONF-810602—) Detonation. Proceedings.** Short, J.M. (ed.). (Naval Surface Weapons Center, Dahlgren, VA (USA)). 1981. Contract W-7405-ENG-36;W-7405-ENG-48. 1104p. NTIS, PC A99/MF A01. Order Number DE83008949.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

Portions are illegible in microfiche products.

Separate abstracts were prepared for 83 papers in these proceedings. (LTW)

54786 (CONF-810602—, pp 3-16) **Ignition of solid high explosive by the rap.. compression of an adjacent gas layer.** Starkenberg, J. (USAARRADCOM, Aberdeen Proving Ground, MD). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

Experiments were conducted to examine the sensitivity of composition-B (comp-B) and TNT to ignition caused by the rapid compression of an adjacent air gap. These showed that compressive heating of air is a viable explosive ignition mechanism which is active when the time to ignition lies in the 100 μs to 1 ms range. Issues considered in these experiments were the role of air in producing ignition (including effects of gap thickness, initial pressure, leakage and convergence) and the effect of the state of the explosive surface. The commonly used adiabatic compression model was shown to be inadequate to describe all the effects. A more sophisticated finite compression-rate model was developed to aid in understanding the influence of parameter variations on sensitivity. The test procedure was improved with the introduction of instrumentation to measure the pressure history at the explosive sample so that ignition thresholds could be determined without ambiguity and directly compared to the analytical results. The analysis and the experiments showed that pressurization rate and gap thickness are the principal parameters governing compressive heating ignition. Precompression of the explosive sample was observed to grossly influence sensitivity to the extent of inverting the order of sensitivity of TNT and comp-B.

54787 (CONF-810602—, pp 17-23) **Influence of the dynamic compressive strength properties of HE formulations on the growth of reaction.** Coley, G.D.; Whatmore, C.E. (AWRE, Berkshire, England). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

Explosiveness has been correlated with dynamic materials properties, for three series of HE compositions, containing HMX and polyurethane binders based on the HTPB/IPDI system. Each series of compositions contained either 95.5, 96.0, or 97.5 w/o HMX. The mechanical properties within each series were varied by changing the particle size distributions of the HMX crystals and by incorporating different degrees of cross-linking into otherwise chemically similar binder systems. Explosiveness was found to be related to the HMX content and the degree of plastic deformation quantified in a drop test in terms of the ratio (X/sub e//X/sub t/), where X/sub t/ is the failure strain of the material, and X/sub e/ is the failure strain for a hypothetical elastic material with identical tangent modulus and failure stress. The relationship has also been shown to hold, for an additional series of HMX/polyurethane compositions containing 97.5 w/o HMX, but with liquid paraffin incorporated into the binder system.

54788 (CONF-810602—, pp 24-35) **Effect of polymers on the drop-weight sensitiveness of explosives.** Swallowe, G.M.; Field, J.E. (Cavendish Lab., Cambridge, England). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

It has recently been reported that the addition of particles of certain polymers to secondary explosives can affect their sensitiveness to impact. At first sight this is surprising, since polymers have relatively low softening temperatures. However, the research described in this paper has confirmed this observation and has provided evidence for the likely hot-spot mechanisms. Thermogravimetric analysis showed that the chemical influence of polymer particles on the breakdown of the explosive is small and could not, of itself, account for the large changes in sensitiveness observed. The conclusion drawn is that the sensitizing effect is due to the mechanical behaviour of the polymer particles. High-speed photography revealed that polymers which sensitize deformed locally giving many cracked regions and areas of localized shear, whereas the inactive materials underwent bulk plastic deformation. A marked difference in the form of the force-time curve during impact between sensitizing and nonsensitizing materials was recorded; the sensitizing materials showing a sudden pressure drop corresponding to the catastrophic failure of the sample. For many polymers their thermal properties are not known and measurements were made on a number over a range of temperatures. From the results of these experiments, predictions were made of the likely sensitizing effect of two other polymers. Experimental results agree with the predictions.

54789 (CONF-810602—, pp 36-42) **Initiation of explosive charges by rapid shear.** Frey, R.B. (US Ballistic Research Lab., Aberdeen Proving Ground, MD). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

We have formulated a model to describe the heating which can occur at shear bands or sliding interfaces in an explosive. The model predicts that there is a maximum temperature which can be obtained (in the absence of reaction) at any given pressure and shear velocity. The maximum temperature is especially dependent on pressure. When chemical heat release is included in the model, the shear rate required to achieve thermal explosion in any given time decreases sharply as pressure increases. The time to achieve any given temperature (in the absence of reaction) and the width of the heated region depend on conditions, but the time can be much less than one microsecond, and the width is typically less than one micron.

54790 (CONF-810602—, pp 43-49) **Thermal explosion hazard of thin layers of gelatine dynamite.** Persson, A.; Jerberyd, L. (Nitro Nobel AB, Stockholm, Sweden). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

This investigation was carried out to determine the hazard of unintentional heating of an explosive layer during the welding of the plastic packing of dynamite. The temperature profile in the layer has been studied using a one dimensional model. As no values of the decomposition parameters were known, these have been determined experimentally in the temperature interval of 200 to 270°C using an adiabatic furnace. The reliability of the experimentally determined values of the activation energy, and the product of the pre-exponential factor and the heat of decomposition was checked in other experiments in which the time to explosion was measured. Using the model to simulate the temperature increase during welding made it possible to estimate the maximum allowable welding times for layers of different thicknesses.

54791 (CONF-810602—, pp 50-55) **Electron beam initiation of high explosives.** Stolovy, A.; Aviles, J.B. Jr.; Jones, E.C. Jr.; Namenson, A.I. (Naval Research Lab., Washington, DC). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

The thermal initiation process in confined high explosives is observed by using an electron beam as the initiating source. The beam deposits energy uniformly and rapidly. Analysis of the data is greatly simplified by the absence of thermal gradients. Temperature and gas pressure are obtained simultaneously with about 2 millisecond time resolution. Data have been obtained for TATB, HBX-1 and PBX-9404, which yield information on thermal initiation thresholds, explosion temperatures, and kinetic parameters, under these dynamic conditions. A multi-reaction theory is being used to analyze the TATB data, which shows the growth of two exothermic reactions. An endothermic reaction, probably associated with an impurity, is also observed.

54792 (CONF-810602—, pp 65-74) **Molecular electronic structure and initiation of secondary explosives.** Delpuech, A.; Cherville, J.; Michaud, C. (Commissariat a l'Energie Atomique, Sevran, France). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

The study by Quantum Chemistry methods of the electronic structure of four families of organic explosives: nitroaromatics, nitramines, nitric esters and tetrazoles, allowed to propose a molecular criterion for shock sensitivity. This work presents the extension of this study to the family of picrylazoles. This extension confirms the hypothesis according to which explosive decomposition is preceded by a modification in the electronic structure of the molecule. On the basis of this result, we propose a mechanism of the initiation phase. This mechanism leads to define the conditions for the birth of detonation in terms of the characteristics of the molecular population behind the shock front: excited and decomposed molecules. In order to bring an experimental confirmation to these propositions, we have observed by high speed Raman Spectrometry, the structural modifications in R.D.X. and P.E.T.N. molecules behind shock front, and before exlosive decomposition. The first results obtained are in agreement with the existence behind the shock front of molecules having undergone a modification in their electronic structure.

54793 (CONF-810602—, pp 75-83) **Thermal decomposition of RDX below the melting point.** Pugh, H.L.; Davis, L.P.; Wilkes, J.S.; Carper, W.R.; Dorey, R.C. (USAF Academy, CO). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

Thermal decomposition of RDX below its melting point was observed by means of electron paramagnetic resonance in experiments performed on neat RDX and on RDX in solution with TNT. Kinetic information for the production and depletion of an RDX intermediate radical species and for the production of NO_2 was obtained for RDX/TNT mixtures over a temperature range from 125°C to 185°C. The activation energy for the production of the RDX intermediate radical was 55.6 kcal/mol, while apparent activation energies for the decay of this species and for the production of NO_2 were 47.7 and 29.8 kcal/mol, respectively. The RDX intermediate radical was also observed in neat RDX from 175°C to 205°C.

54794 (CONF-810602—, pp 84-92) **Some comments regarding the sensitivities, thermal stabilities, and explosive performance characteristics of fluorodinitromethyl compounds.** Kamlet, M.J.; Adolph, H.G. (Naval Surface Weapons Center, Silver Spring, MD). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

The theoretical considerations which led to the initial synthesis of compounds containing the $FC(NO_2)_2$-group are reviewed. It is shown that enhanced sensitivity and thermal stability properties of 1-fluoro-1,1-dinitro compounds relative to corresponding 1,1,1-trinitro compounds are primarily due to reduced steric hindrance, which allows free rotation of the nitro groups about the C-NO_2 bonds, such free rotation acting in effect as an internal energy sink. When steric hindrance to free rotation is reintroduced, as when the $FC(NO_2)_2$-group is α or β to another gem-dinitro function or α to an aromatic ring, sensitivity and thermal stability properties become relatively poor.

54795 (CONF-810602—, pp 93-103) **Role of excited electronic states in the bond-scission process in detonation reactions.** Bardo, R.D. (Naval Surface Weapons Center, Silver Spring, MD). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

A model is presented which demonstrates the role played by certain excited electronic states in detonation reactions. The features of the model are derived from ab initio and semiempirical electronic structure calculations. The results of calculations for the isolated molecules NO, NO^+, NO_2, CH_3NO_2, nitrobenzene, 4-nitroaniline, and TATB are compared with those for the groups of interacting molecules $(NO)_2$, $(NO^+)_2$, $(NO_2)_2$, $(CH_3NO_2)_2$, and $(CH_3NO_2)_3$. The salient feature of the model is the large pressure-induced reduction of the activation energy for bond scission in the nitric oxides and in molecules containing NO_2 groups. The N-O bond is seen to break via a mechanism for radiationless transitions at high pressures and temperatures. Possible unimolecular and bimolecular reaction mechanisms for reacting $(NO)_2$ are given.

54796 (CONF-810602—, pp 107-118) **Studies on transition from deflagration to detonation in high explosives at very small diameters.** Thivet, R.; Guy, L.R. (Centre de Recherches du Bouchet, Vert le Petit, France). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

Deflagration to detonation transition (DDT) phenomena has been studied with RDX, HMX and HNS to use it in pyrotechnic devices. The results show that DDT may appear with smaller column diameters up to about 1 mm, and it is possible to use it in place of primary explosive in pyrotechnic trains. The first parameter studies the column diameter, and it was found that the predetonation length (PCL) is about the same, whatever the diameter (20 to 35 mm for HMX and RDX, as a function of the particle size). With RDX, there is always DDT in .6 mm column diameter. For HMX, the minimum diameter is 1 mm. With HNS, DDT is also obtained in a 1.2 mm column diameter. The effect of other param-

eters (particle size, load density, column length, confinement) on DDT is alike studied. Beyond the verification of general laws about DDT, the results fix the characteristic data of DDT and show the interaction between density and particle size on DDT; it is found that, in the diagram density/particle size, there is a zone in which DDT may appear. The experimental study is completed by the determination of the pressure story in different points of the column, and the pressure front propagation velocity.

54797 (CONF-810602—, pp 119-138) **Deflagration-to-detonation transition studies of porous explosive charges in plastic tubes.** Bernecker, R.R.; Sandusky, H.W.; Clairmont, A.R. Jr. (Naval Surface Weapons Center, Silver Spring, MD). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

The deflagration to detonation transitional processes for very porous explosive charges, confined in thickwalled plastic tubes, have been studied using flash radiography and high speed photography. The radiographic data have provided information concerning the extent of internal reaction (convective burning and compressive burning) and the role of tube deformation in the transitional processes. The explosives used were fine (15 μm) and very coarse (1080 μm) HMX, a mixture of the fine HMX and 7 μm aluminum, and coarse (470 μm) tetryl. Experimental data for very coarse HMX and coarse tetryl confirm that they follow DDT mechanisms, as previously described in high confinement systems. Fine HMX follows a different transitional process. The addition of 10% aluminum to fine HMX appeared to greatly suppress convective burning so that extensive radial and longitudinal compaction could occur before the onset of detonation. Decreasing the porosity of the fine HMX and the coarse tetryl charges prevented the transition to detonation.

54798 (CONF-810602—, pp 139-142) **Deflagration detonation transition in waxes RDX.** Samirant, M. (French-German Research Inst., Saint-Louis, France). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

DDT tests in a steel confined waxed RDX (95-5) (73%) TMD have been run out. The data accumulated with this typical set-up are: combustion front path in the x-t plane; shock-wave path in the x-t plane; pressure vs time profiles at different location in the burning and detonating zone; and densities of the explosive bed just prior to reaction in the downstream part of the DDT tube. A stationary deflagration took place in the predetonation column. The transition occurred during the interaction of a shock wave originating near the initiation end. Under this load and with the same confinement this explosive exhibited direct SDT in a simulation test.

54799 (CONF-810602—, pp 143-150) **Effects of igniter and compaction on DDT run up in plastic pipes.** Butcher, A.G. (Hercules Inc., Magna, UT); Keefe, R.L.; Robinson, N.J.; Beckstead, M.W. 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

The plastic pipe test is used to study events leading to detonation transition in simulated damaged propellant beds. Compaction of the propellant resulting from the igniter was shown by high speed radiography to be as high as 95% TMD. Significant disruption of the flame movement through the propellant bed was caused by the compaction. Testing showed that an igniter producing a 10^5 psi/s pressurization rate would compact the propellant. However, igniters producing 10^3 psi/s do not initially compact the propellant. Prepressurizing the pipe reduces or eliminates this compaction. The effects of eliminating initial compaction are more uniform ignition and an increased run up length. Special instrumentation was used to monitor pressures from 0 to 1000 psi. Testing showed that pressure build-up begins as much as 13 ms prior to visible flame at a measurement location. This low pressure build-up heats and stresses the propellant. Reduction in this low pressure build up time from 10 ms and 4 ms resulted in one order to magnitude decrease in maximum pressure and maximum pressurization rate. This shows that low pressure build-up time is significant in determining the final reaction of the propellant. Data presented in this paper include x-ray measurements of compaction, flame spread variation, and pressure-time history.

54800 (CONF-810602—, pp 151-163) **Experimental study of deflagration to detonation transition case of ammonium perchlorate.** Maurin, C.; Derrien, J.C.; Deneuville, P.; Monteagudo, P. (Centre de Recherches du Bouchet, Vert Le Petit, France). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

This experimental study has been undertaken under the auspices of the French Ministry of Defense (STPE) so that we get a better knowledge of the margin for safety towards the phenomena of deflagration to detonation transition. The experimental outline is as follows: ammonium perchlorate is set in a sealed tube with reinforced mechanical properties; it is initiated in combustion at an extremity. The studied parameters are the thickness of the tube and the power of the initiation. This latter was set with a described here booster the working of which has been particularly studied. If ammonium perchlorate with additives transits easily from combustion to detonation, pure ammonium perchlorate does not do the same. In this latter case, it is necessary to get a small particle size, a very strong confinement and a violent initiation. The results we obtained can be explained from the particular behavior in detonation of ammonium perchlorate which belongs to the group II of Donna Price explosives ranking.

54801 (CONF-810602—, pp 164-174) **Transitions from laminar burning for porous crystalline explosives.** Fifer, R.A.; Cole, J.E. (Army Armament Research and Development Command, Aberdeen Proving Ground, MD). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

Regression rates have been measured at pressures to 350 MPa for pressed binderless HMX as a function of particle size (20 to 300 μm), density (60 to 99% TMD) and lateral confinement in a constant pressure bomb. Photographic observations indicate that at pressures above the transition from laminar to convective burning, deflagration occurs by a progressive deconsolidation (i.e., particle dispersion) mechanism. For small diameter samples, lateral confinement either inhibits the transition, or decreases the regression rate above the transition, depending on the particle and pore size of the material. This indicates that the driving force for deconsolidation is, in fact, an in-depth process (i.e., hot gas infiltration), and that the flame propagates through a bed of already loosened particles. This suggests that the structural strength of the charge, as well as its porosity, affect the transition to-and rate of-convective burning. In a self-pressurizing (closed) bomb, burning is much faster; the pressurization is independent of both porosity and geometry, indicating that deconsolidation is much faster than the subsequent burning of the dispersed particles.

54802 (CONF-810602—, pp 175-185) **Deflagration from an ignition site of a confined explosive charge as a function of venting by orifice flow.** Hershkowitz, J.; Chang, L.M.; Hudgins, H.E. (Large Caliber Weapon systems Lab., Dover, NJ). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

The parameters that could lead to runaway burning (non-detonative explosion) were studied by computer calculations for an explosive confined adjacent to a wall which is impacted by a fragment leading to a crack in the wall, with and without an accompanying crack in the explosive, and also for a punch puncture of the wall by the fragment. For each of these geometries, various initial ignition conditions, burning rates and venting conditions were considered. The model derived a pressure for the volume of gaseous products through a mass balance with the products created at the burning front and those exiting through an orifice with discharge coefficient controlled by variables for both unchoked and choked flow conditions. The linear burning rate laws were of the form Ap/sup B/, separately for low and high rates for each of Composition B4 and TNT, and for a low rate for RDX substituted for those of the explosives. Onset of runaway burning depended on - the ignited volume of explosive and its initial pressure; burning surface includ-

ing area multiplication; rate law; and the orifice dimension chosen. For the fragment impact case, the runaway burning had to occur before the plug-fragment left a hole behind to vent the gases. This required burning initiated at a high pressure directly on the high rate burning curves of the explosives. For each geometry, selected combinations of parameter values are provided to define the domain of non-detonative explosion which range in time for onset of runaway from tens of microseconds to seconds. The model presented can be used for low cost studies of parametric dependence to guide designs and to make selections for further study by finite difference Eulerian-Lagrangian computer programs.

54803 (CONF-810602—, pp 198-215) **Mechanism for the burning rate of high density, porous, energetic materials.** Kooker, D.E.; Anderson, R.D. (US Army Ballistic Research Lab., Aberdeen Proving Ground, MD). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

A mechanism is proposed to explain how the deflagration of a confined, thermally-ignited column of high density, compacted, granular, energetic material accelerates from a surface burning process. A mathematical model for the porous equation of state is derived and the results compared with a compaction wave experiment. A first-generation combustion model is derived and numerical solution difficulties are discussed.

54804 (CONF-810602—, pp 216-224) **Role of gas phase reactions in deflagration-to-detonation transition.** Boggs, T.L.; Price, C.F.; Atwood, A.I.; Zurn, D.E.; Derr, R.L. (Naval Weapons Center, China Lake, CA). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

This paper presents the results from ignition, steady-state combustion, and transient combustion ($dp/dt = 2 \times 10^8$ psi/sec) research. The results show the importance of gas phase reactions especially in the highly transient combustion situations. The results are applied to the deflagration-to-detonation transition (DDT) and recommendations for future work, both experimental and analytical, are made.

54805 (CONF-810602—, pp 225-233) **Phenomenology of the deflagration to detonation transition in propellants and explosives.** Cowperthwaite, M. (SRI International, Menlo Park, CA). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

Model solutions are presented for the deflagration to shock transition (DST) process associated with the propagation of an accelerating flame in propellant contained in a closed tube. The flame is treated as a reactive discontinuity, the flow in front of the flame as a simple compression wave, and the density gradient in the flow behind the flame is assumed to be zero. The solutions are based on expressions for the burning rate and the acceleration of the flame and are valid until the time the reaction becomes complete in the flame. Consideration of the evolution of the shock preceding the flame after this time led to a postulate for assessing the probable occurrence of the deflagration to detonation transition (DDT). Examination of particular solutions in the light of this postulate showed that DDT depends strongly on the burning rate and will probably not occur unless the burning rate parameter exceeds a critical value.

54806 (CONF-810602—, pp 247-255) **Nondetonative explosions in confined explosive charges.** Frey, R.B.; Trimble, J.J. (US Ballistic Research Lab., Aberdeen Proving Ground, MD). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

We have observed the propagation of nondetonative explosions in confined charges using pressure gages, strain gages, IR detectors, and ionization probes. The reactions can propagate for long distances at about 2 km/sec without transiting to detonation or dying out, and the phenomenon appears to be the same as that which has been called low velocity detonation or a predetonation transient wave by others. Sometimes delays of several hundred microseconds are observed after ignition before the reaction begins to propagate. During this time, the pressure rises slowly and the reaction remains localized. When the charge begins to deform plastically, a strain wave propagates down the charge followed closely by reaction. When the delay is short, a compression wave moves down the charge ahead of the strain wave. The pressure in this wave rises slowly over 20 μsec or more. The propagation of reaction appears to be correlated with plastic strain in the confinement. We believe that the reaction is ignited at downstream points as a result of deformation under pressure. Ignition could occur internally as a result of inter-granular friction or shear banding, or it could occur at the explosive metal interface where large relative velocities are expected during charge expansion.

54807 (CONF-810602—, pp 265-272) **Delayed detonation in card gap tests.** Keefe, R.L. (Hercules Inc., Magna, UT). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

The NOL large-scale card gap test is used to rank explosives and propellants according to their susceptibility to shock-induced detonation. Recent tests have resulted in thresholds for detonation at two distinctly different levels of shock stimulus for a given sample. These multilevel results are further characterized by two distinct reaction time regimes. Transit time measurements have shown that detonations occurring under shock stimulus exceeding the first threshold usually are initiated in the first 2 to 10 millimeters of sample length. The total time in these tests from incident shock application to completion of reaction is on the order of 20 μsec. The mechanism of these reactions is referred to as shock to detonation transition (SDT). Detonations occurring under shock stimulus between the two thresholds are initiated approximately 60 to 75 millimeters into the sample. The time to completion of these delayed detonations is on the order of 50 μsec. The mechanism producing these detonations is as yet undefined and is being called XDT. Data presented in this paper include multilevel thresholds, transit time measurements, and probit tests showing frequency of detonation versus incident shock level.

54808 (CONF-810602—, pp 278-284) **Shock initiation in gap test configurations.** Foan, G.C.W.; Coley, G.D. (AWRE, Berkshire, England). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

A unique gap test has been developed to determine the critical shock initiation conditions for HE with widely differing sensitivities initiated by a range of donor charge materials and geometries. A strain-compensated pressure transducer was developed to measure the pressure/time histories of the divergent pressure pulses produced by each donor/barrier combination at the 50% gap value. Initiation criteria are discussed.

54809 (CONF-810602—, pp 285-298) **Shock initiation and subsequent growth of reaction in explosives and propellants: the low amplitude shock initiation test, LASI.** Tasker, D.G. 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

A modified gap test experiment is described which allows the development of reaction in explosive charges to be measured. Results are given for a number of explosives and compared with those of the large scale gap test. Evidence of physical, and perhaps chemical, changes in RDX based materials is given at pressures below those required to initiate reaction.

54810 (CONF-810602—, pp 299-307) **Instrumented shotgun facility to study impact initiated explosive reactions.** Jensen, R.C.; Blommer, E.J.; Brown, B. (Hercules Inc., Magna, UT). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

The instrumented shotgun is a tool developed specifically to investigate impact-related shock phenomena in solid rocket propellants. The shotgun facility includes a gun which fires propellant samples at high velocity, over-pressure gages, flash radiographic

equipment, a high-speed camera, and associated data acquisition equipment. Instrumented shotgun tests have been conducted on high energy propellant over an impact velocity range from 0.152 to 1.52 mm/μsec (500 to 5000 ft/sec). Three different types of reactions have been observed. Reactions were classified based on flash x-ray photographs, blast overpressure, light intensity, and target plate damage. No sharp velocity threshold exists between the various reaction regimes. Reactions at impingement velocities less than those required to produce high order detonation have been of major interest.

54811 (CONF-810602—, pp 308-315) **Initiation of burning and detonation in cast H-6 and cast PBXW-109.** Liddiard, T.P.; Forbes, J.W. (Navel Surface Weapons Center, Silver Spring, MD). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

An experimental study of the initiation of reaction in cast H-6 and PBXW-109 by shock waves of moderate amplitude has been conducted using a gap test arrangement. The pressure thresholds for burning for cast H-6 and PBXW-109 are 17.5 and 18.0 Kb, respectively. The pressure thresholds for detonation for cast H-6 and PBXW-109 are 58 and 75 Kb, respectively. A main feature about these explosives is the low pressures required for the start of burning while relatively large pressures are necessary for detonation. A polymethyl methacrylate plate was placed above the initial free surfaces of the test samples so that the accelerated material would impact the plate while the camera is recording the event. Both explosives exhibit violent reactions upon impact when the input pressures are 5 to 10 Kb below the thresholds for detonation.

54812 (CONF-810602—, pp 316-324) **Critical conditions for shock initiation of detonation by small projectile impact.** Moulard, H. (French-German Research Inst., Saint-Louis, France). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

Flyer plate initiation tests and small projectile impact initiation tests were performed on three secondary explosives. Analysis and typical experiments demonstrate clearly that critical energy or $p^a tau$ criterion is not sufficient for describing two-dimensional critical conditions for shock-detonation transition. Moreover, all the data are consistent with the concept of a critical surface area which is proposed as a new control parameter for shock-detonation transition.

54813 (CONF-810602—, pp 336-342) **Sensitivity to initiation of HE-wax compounds at different temperatures.** Klee, C.; Ludwig, D. (Messerschmitt-Bolkow-Blohm GmbH, Schrobenhausen, West Germany). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

The paper presents expeiments and results concerning the sensitivity to initiation of HE-wax compounds. The desensitization of RDX/Wax 95/5, RDX/Wax 92/8 and TNT/RDX/Wax 49/50/1 with different densities were studied as a function of test-temperature by measuring run-up distance as well as by performing Bruceton-tests. All results show a significant influence of the wax content and the test-temperature on the sensitivity of the tested explosives. Both increasing wax content as well as increasing test-temperature up to ~ 60°C results in a decrease of sensitivity. The desensitization at test temperatures of ~ 60°C is supposed to be caused by a change in wax consistency.

54814 (CONF-810602—, pp 343-351) **Formation and distribution of hot spots in slurry explosives under projectile impact.** Feng, K.K. (Canadian Explosives Research Lab., Ottawa); Chung, W.K.; Yu, J.M.; Lu, B.C.Y. 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

The behavior of slurry explosives with hypothetical compositions under projectile impact during the buildup period but before combustion takes place has been studied by a numerical method. The container of the explosive is of cylindrical form. The deformation and pressure wave histories of the explosives together with the formation and distribution of hot spots and their temperature variation with time have been determined. The parameters investigated include the ratio of solid explosive to liquid, volume percentage of air, temperature dependence of γ of air, effect of entrained gas other than air, initial temperature of the explosive, and projectile velocity. Both the ideal gas and the BKW equations of state have been used in the evaluation of hot-spot temperatures. The maximum amounts of air which are entrained in slurry explosives with different solid-to-liquid ratios that may be initiated by impact induced hot spots under the conditions investigated are suggested.

54815 (CONF-810602—, pp 352-361) **Mechanism of initiation of composition B by A metal jet.** Chick, M.C.; Hatt, D.J. (Materials Research Labs., Victoria, Australia). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

Flash x-radiography was used to study the shaped charge jet initiation of Composition B covered by steel barriers. The results demonstrated that jet impact created a shock that travelled ahead of the jet, entered the explosive and ran to detonation. The critical initiation pressure was 1.5 to 3 GPa with a run to detonation of about 50 mm. Removal of the precursor shock considerably increased the sensitivity of the explosive to jet impact. In contrast jet impact alone caused detonation close to the explosive surface with excess transit times of less than about 0.5 μs. It is proposed that the marked difference in sensitivity between the two methods of initiation is due to the precursor shock desensitizing the explosive and stopping jet initiation. Thus the barrier thickness has to be decreased until the precursor shock itself is sufficiently strong to cause initiation.

54816 (CONF-810602—, pp 362-370) **Investigation of transient processes at initiation of high explosives.** Titov, V.M.; Lobanov, V.F.; Bordzilovsky, S.A.; Karakhanov, S.M. (Inst. of Hydrodynamics, Novosibirsk, USSR). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

This paper presents the method of numerical modeling of the detonation wave development in heterogeneous condensed explosives as well as the experimental results compared with the theoretical ones. In the computational model the medium of the reaction zone is assumed as the mixture of unreacted explosive and detonation products with mass concentrations (1-q) and q ($o \leqq q \leqq 1$), respectively. The system of gasdynamical equations added by macrokinetics equations of decomposition and Mi-Gruenaisen equations of state for explosive and detonation products is solved by the difference method developed by S.K. Godunov. A formal adding of some concentration ($q = 0.0005$) of explosive products into an initial explosive allows to model transient processes in porous explosives. The obtained detonation characteristics are in good agreement with the experimental data available. In the experiments with cast TNT the reacting wave profile evolution initiated by a weak shock wave was recorded in a one-dimensional statement. When initiating the detonation in cast TNT by a driver of finite dimensions, the reacting wave motion was recorded by resistance probes.

54817 (CONF-810602—, pp 373-384) **Effect of cavitation on the shock sensitivity of liquid explosives.** Mohan, V.K. (IDL Chemicals Ltd., Hyderabad, India); Hay, J.E. 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

Studies on the effect of cavitation on the shock sensitivity of liquid explosives using an instrumented card-gap test arrangement have shown that while nitromethane, nitromethane/tetranitromethane (55/45), monomethylamine nitrate solution (88%), molten dinitrotoluene and molten trinitrotoluene are sensitized, nitromethane/trichloroethylene (70/30), molten dinitrophenol and molten ammonium nitrate remain unaffected. In experiments aimed at investigating the effect of the nature of the gas on the shock sensitization, propane, nitrogen, oxygen and argon were used to achieve cavitation. The results demonstrated the effect of physical and chemical nature of the gas on the shock sensitivity. Further, results of the tests done on nitromethane/organic diluent systems indicate that in

addition to density and oxygen balance of the diluent, its vapor pressure may also play a role in governing the shock sensitivity of the mixture. Results of this work suggest that adiabatic collapse of bubbles giving rise to hot spots in the liquid is of importance in the initiation process of heterogenous explosives.

54818 (CONF-810602—, pp 408-415) **Diverging detonations in RDX and PETN based cast-cured PBX.** Bonthoux, F.; Deneuville, P.; de Longueville, Y. (Centre de Recherches du Bouchet, Vert le Petit, France). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

Diverging detonations are studied with samples consisting in a mushroom shape, a cylindrical part topped by an hemisphere. Detonator and booster are located at the free end of the cylinder part. By using a streak recording camera, it is possible to measure the detonation velocity in the cylinder and the output of the hemisphere. Several different values of diameters are chosen for each part of the so-called mushroom, with a lower value for the cylindrical part. Two different formulas have been investigated, containing respectively 88% RDX in a HTPB binder and 77% PETN in a polyurethane binder. For a better knowledge of their main properties, some parameters have been measured, such as detonation velocity as a function of sample diameter, and an estimate of detonation pressure. Finally, the response to some different given duration shock waves (in the range from 0.15 to 1.5 microseconds) is considered for both compositions. All these data will be used in the analysis of diverging detonations in the mushroom samples. Based on streak and framing cameras recordings, the shapes of the detonation fronts have been interpolated for several different times in the hemisperical part of the samples. The results with PETN based PBX show that there is a very good trend to diverging detonation, even for the smallest value of the cylindrical part diameter (10 mm). On the contrary, RDX based PBX exhibits a very different behavior. In this case, and for a cylindrical part diameter of 10 mm, it seems that a large part of the hemispherical area is not detonated. The results can fairly be correlated with the main detonation properties presented in the first part of the paper for each composition (sensitivity, pressure...) and give fruitful information for a better use of these formulas in some complex warheads.

54819 (CONF-810602—, pp 425-434) **Shock initiation of TATB formulations.** Honodel, C.A. (Lawrence Livermore National Lab., CA); Humphrey, J.R.; Weingart, R.C.; Lee, R.S.; Kramer, P. 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

The shock initiation threshold for a number of TATB compositions at different densities has been measured for short duration pulses from flyer plate impact and for longer pulses in gap test experiments. We relate the observed differences in sensitivity to the method of preparation and physical characteristics of the TATB. We discuss similarities and differences observed in the thin pulse and gap test experiments.

54820 (CONF-810602—, pp 435-447) **Two-phase viscoplastic model of shock initiation of detonation in high density pressed explosives.** Khasainov, B.A.; Borisov, A.A.; Ermolaev, B.S.; Korotkov, A.I. (Inst. of Chemical Physics, Moscow, USSR). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

Macroscopic behavior of reactive shock waves having amplitudes of 1 to 3 GPA and causing build-up of detonation in heterogeneous high explosives are studied rather comprehensively. However, the mechanisms of these processes are still being the subject of speculations. The reason for that stems from the fact that the chemical reaction in moderate and weak shock waves starts in so called reaction centers (or hot spots), rather than homogeneously. Neither the reaction initiation nor its propagation mechanisms are completely clear. In many theoretical treatments of shock initiation of detonation the real mechanism of inhomogeneous reaction is not accounted for; instead bulk heat release rate expressions are introduced formally in order to fit experimental data. A few attempts to elucidate actual mechanisms of the reactive shock wave transition to detonation result in expressions essentially dependent on some fit coefficients which do not have an appropriate physical ground. This paper presents one of the possible models of shock initiation of detonation in solid explosives with initial porosity of the order of 1%. The model which requires the knowledge of fundamental properties of the explosive material (pore size distribution, viscosity, thermal conductivity and the reaction rate Arrhenius parameters) only is based on the assumption that reaction is initiated at a pore surface heated by viscous flow, and then propagates in a form of surface burning.

54821 (CONF-810602—, pp 459-465) **Model of impact ignition and explanation of critical shock initiation energy. II. Application.** Andersen, W.H. (Whittaker Corp., North Hollywood, CA). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

An approximate model of shock ingition is developed and shown to agree qualitatively with experiment. It assumes that ignition time is the time it takes the hot reaction products in hot spots that are initiated near the shock front to heat and ignite the adjacent solid material, so as to set up a spreading grain burning reaction. The heat conduction and ignition processes are discussed. Heat flux increases with increased preasure, and is controlled by hot spot size. Reaction temperature increases with increased heat flux and slower reaction kinetics. Under conditions that the reaction temperature is large compared to the shock temperature of the material, the surface heating (prior to thermal reaction) occupies most of the ignition delay time. The material then exhibits near critical energy initiation behavior. Deviations occur when the surface heating time (compared to reaction time) is no longer dominant. At a sufficiently high concentration of hot spots (or high pressure), the initiation becomes homogeneous in nature.

54822 (CONF-810602—, pp 498-505) **Constitutive model for calculating chemical energy release rates from the flow fields in shocked explosives.** Cowperthwaite, M. (SRI International, Menlo Park, CA). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

The constitutive relationships required to calculate energy release rates from flow fields determined in Lagrange gage studies of shocked explosives are the subject of this paper. The explosive and its reaction products are treated as a mixture of phases that attains mechanical but not thermal equilibrium. Application of the first law of thermodynamics to this system shows that transfer of heat from the reaction products to the explosive is necessary for the propagation of the reaction. A model constitutive relationship for energy release rate calculations was based on the premise that no appreciable amount of heat is transferred into the bulk of the explosive. Thermodynamic properties of this constitutive model were developed and used with particular equations of state to calculate the extent of a reaction in a steady detonation wave and thereby demonstrate the role of constitutive relationships in Lagrange gage studies of explosives.

54823 (CONF-810602—, pp 506-516) **Void collapse model for shock initiation.** Partom, Y. (ADA, Haifa, Israel). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

We propose a shock initiation model for solid explosives, which is based explicitly on the hot-spots concept. We show that the dynamics of hot-spots growth can be described by a steadily moving decomposition front. We compute the velocity v of this front as a function of temperature in the solid phase T/sub s/, and show that v is independent of the initial conditions. We incorporated the v (T/sub s/) relation in a 1-D Lagrangian hydro-reactive code called YIZUM, which simulates shock initiation problems. We give examples of simulations for PETN. These include run to detonation and time to detonation curves for different densities, detonation threshold curves, and pressure histories. Agreement with experimental data is encouraging.

54824 (CONF-810602—, pp 523-528) **Hot spot and bulk temperature induction in shock compressed explosives.** Frankel, M.J.; Pastine, D.J. (Naval Surface Weapons Center, Silver Spring, MD). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

A computationally convenient technique for calculating the shock-induced temperature increase in porous explosives is presented and applied to RDX. It is assumed that an accurate temperature dependent specific heat may be built from spectroscopic data. The pressure-dependent temperature rise in RDX associated with both pore collapse and bulk compression under shock is calculated by combining the Gruneisen equation of state with the Rankine-Hugoniot jump conditions, the pressure particle velocity Hugoniot, and the temperature dependent specific heat function.

54825 (CONF-810602—, pp 540-547) **Comparison of TATB and DINGU explosive properties.** Deneuville, P.; Gaudin, C.; de Longueville, Y.; Mala, J. (Centre de Recherches du Bouchet, Vert-Le-Petit, France). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

TATB and DINGU exhibit very similar behavior to impact or shock wave sensitivity tests, though DINGU has a much higher burning ability. A detailed comparison of both explosives, related to detonation properties, is presented. According to this criterion, DINGU and RDX are equivalent for large size samples and at moderate rates (< 20%), whereas TATB is a significantly less efficient explosive. So, the use of DINGU can be foreseen when an improved safety is required.

54826 (CONF-810602—, pp 548-559) **Detonation in intermolecular explosives: characteristics of some eutectic formulations.** Akst, I.B. (Idos Corp., Pampa, TX). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

Detonation characteristics of EA, alone and with additives, were determined in several kinds of performance tests. The data are related to detonations in which reactions between components are significant and to the elemental balances in the explosives. Fast reaction is evident, as is the good performance of these simple, inexpensive formulations.

54827 (CONF-810602—, pp 560-565) **Influence of inert binders on detonation properties of cast-cured PBX.** de Longueville, Y.; Delclos, A.; Gaudin, C.; Mala, J. (Centre de Recherches du Bouchet, Vert-Le-Petit, France). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

Experimental evidence of so-called inert binder influence on the detonation properties of explosives is presented. A geometrical assessment on detonation processes leads to a strong consistency between experimental and computed data related to a set of PETN-polyurethane compositions. Consequently, a simple tentative model gives a lot of information on the behavior of cast-cured PBX in the C.J. state and the Taylor wave. As a conclusion, trends to formulate improved inert binders are described.

54828 (CONF-810602—, pp 575-582) **Low-velocity detonation of nitromethane.** Schilperoord, A.A. (Prins Maurits Lab., Rijswijk, Netherlands). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

Experimental work is described which shows that nitromethane is able to undergo a low-velocity detonation (LVD) reaction, if confined in a steel tube and subjected to a shock wave of appropriate strength. It is concluded that the occurrence of LVD in nitromethane requires such conditions as to enable both cavitation of the liquid and sufficient explosive reaction. The latter condition means a rather strong confinement, because of the relatively low reaction rate of nitromethane. The results of this work may lead to an improved design of a gap test for the investigation of the shock wave sensitivity of liquids.

54829 (CONF-810602—, pp 583-588) **Influence of additives on nitromethane detonation characteristics.** Presles, H.N. (ENSMA, Poitiers, France); Brochet, C.; Kato, Y.; Tanaka, K. 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

In spite of several studies done in the past, it cannot be predicted, a priori, how a diluent takes part in the detonation properties of a liquid explosive when the diluent is added to the liquid explosives. On the basis of experimental and calculated detonation velocities and temperatures of several homogeneous liquid mixtures of nitromethane and various additives, we show that the latter are involved in the chemical reactions. Furthermore, we show that the critical diameter and also the cellular structure of the detonation front partly depend on the additive density.

54830 (CONF-810602—, pp 589-601) **Theory to predict the velocity-diameter relation of explosives.** Chan, S.K. (Imperial Chemical Industries Ltd., Ayrshire, England). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

The Wood-Kirkwood theory on two-dimensional detonation is extended by integrating the equations of motion with respect to an axial stream tube area A. A polytropic equation of state is used with the integral relationships to give the Chapman-Jouguet parameters in terms of A. A functional form of $A = (1 + a\kappa/d)^2$ is assumed where the coefficient a/d is determined by the radius of curvature of the detonation front which is in turn related to the charge diameter using an empirical relationship. The theory is applied with simple reaction rate functions to predict the velocity-diameter curves for four explosives: Comp-B, PBX-9404, nitromethane/silica and nitromethane. The rate parameters are obtained by fitting the theoretical critical diameter and the corresponding detonation velocity to the experimental values. The reaction rates thus derived and the predicted velocity-diameter curves are in good agreement with available experimental results.

54831 (CONF-810602—, pp 602-607) **Some results on the converging spherical detonation in a solid explosive.** Cheret, R.; Chaisse, F.; Zoe, J. (Centre d'Etudes de Vaujours, Sevran, France). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

One deals with converging one-dimensional (spherical or cylindrical) detonations and is particularly concerned with the relation between velocity D and mean curvature R^{-1}. Due to considering the extreme case where the detonation does not differ from a strong shock and the other extreme case where the detonation velocity shortly exceeds the C.J. value, two limiting expansions of D versus R^{-1} are derived, and an interpolation formula is set up. Two converging spherical detonation experiments in a well-known plastic-bonded HMX composition are reported; their interpretations bring forth strong arguments in favor of the validity of the proposed interpolation.

54832 (CONF-810602—, pp 634-640) **Chapman-Jouguet detonation and its acceleration for a perfect fluid without conduction.** Damamme, G. (French Atomic Energy Commission, Sevran, France). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

In a perfect fluid without conduction the acoustic waves catch up detonation if it is a converging one and not otherwise. In the first case the detonation is accelerated, we established the equations of its motion and we show that if the boundary conditions are moderate, the motion only depends on the initial geometry of the explosive.

54833 (CONF-810602—, pp 641-645) **Simulation of the reaction zone of heterogeneous explosives.** Damamme, G.; Missonnier, M. (French Atomic Energy Commission, Sevran, France). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

Modeling of transient regimes of detonation must take account of the reaction rate. Only having available overall experiments which are limited in number the submitted model should be simple but nevertheless physically consistent.

54834 (CONF-810602—, pp 661-668) **Influence of the reaction zone on the state of detonation in a steady axial wave.** Thouvenin, J. (Centre d'Etudes de Limeil, Paris, France). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

If the finite size of the reaction zone and the bidimensional characteristic of a steady axial wave are taken into account, the state of detonation is not located on the Hugoniot curve, but below. A simple treatment of the combustion curve makes possible a thorough calculation of the locus of the states of detonation, leading otherwise to the width of the reaction zone. For TATB, a width of 0.5 to 0.65 mm is found.

54835 (CONF-810602—, pp 678-685) **Explosive equation of state determination by the AWRE method.** Bailey, W.A.; Belcher, R.A.; Chilvers, D.K.; Eden, G. (Atomic Weapons Research Establishment, Berkshire, England). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

A two-part Cylinder Test coupled with the 2D characteristic code ELA yields the relevant constants of the Jones-Wilkins-Lee equation of state for detonation products. A high resolution optical method is used to measure the initial motion of an explosively driven expanding copper cylinder and electrically charged pin arrays monitor the whole expansion out to three diameters. A good analytical fit is made to the results using a summation of functions to give the mean trajectory. This is used as a reference for graphical comparison against trajectories derived from both ELA calculation and individual experiments. Differences are reduced systematically to refine the value of each JWL constant in turn, with minimal effect on those previously chosen. To demonstrate the method, results for 95/5 HMX/Polyurethane are reported.

54836 (CONF-810602—, pp 686-694) **Elementary solution for the equations of the zeroth order internal structure of a strong detonation in a solid high explosive.** Chaisse, F.; Cheret, R.; Paul, S.; Servas, J.M. (Centre d'Etudes de Vaujours, Sevran, France). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

The detonation wave is considered as a steepening layer in an inert dissipative fluid followed by an expansion process in chemically reactive perfect fluid. When using simple but realistic equations of state and chemical energy deposition law, we achieve - in the sense of the singular perturbation theory - a numerical solution of the zeroth order internal structure of a strong detonation.

54837 (CONF-810602—, pp 695-702) **Numerical simulations of non-ideal detonations of a heterogeneous explosive with the two dimensional eulerian code C.E.E.** Donguy, P.; Legrand, N. (Commissariat a l'Energie Atomique, Villeneuve-St-Georges, France). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

A chemical kinetics model has been introduced into the two-dimensional eulerian compressible hydrodynamic code, C.E.E., to deal with the initiation and detonation of heterogeneous explosives not always behaving ideally. Numerical simulations and experimental results from several specific cases are presented and compared.

54838 (CONF-810602—, pp 703-715) **Detonation properties of condensed explosives calculated with an equation of state based on intermolecular potentials.** Chirat, R.; Pittion-Rossillon, G. (Commissariat a l'Energie Atomique, Villeneuve-St-Georges, France). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

A new equation of state (EOS) to calculate detonation properties of CHNO explosives is presented. It is based on intermolecular potentials (as are the LJD, JCZ, EOS) and is a simplified adjustment for reactive mixtures of WCA and LEE, LEVESQUE theories. The new EOS is reviewed in full but no justifications are given. A more accurate treatment of attractive portion of potential is presented. The new EOS gives good accordance with the Monte-Carlo E/NkT and PV/NkT isotherm network in the range $0 < p^* < 3$ and $2.74 < T^* < 100$. The H_2O, N_2, CH_4, O_2, H_2, NH_3 $(\alpha\sigma\epsilon)$EXP-6 potential parameters are fitted individually on shock experiments. The No, CO, CO_2 $(\alpha\sigma\epsilon)$EXP-6 potential parameters are fitted indirectly. For PETN, RDX, TNT, TATB, COMPOB explosives the detonation properties (CJ point, CJ isentrope) are compared with BKW, LJD, JCZ, EOS and experimental data. The results are all the more successful as no ad-hoc parameter is added in the new EOS. This EOS can be extended to explosives other than CHNO.

54839 (CONF-810602—, pp 716-720) **Theoretical EOS for reaction products of RDX.** Jones, H.D. (Naval Surface Weapons Center, Silver Spring, MD). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

A perturbation technique is used to provide an accurate and convenient description of simple, dense fluids based on intermolecular forces. This is successfully applied in the exploratory modeling of the complete equation of state for the reaction products of RDX.

54840 (CONF-810602—, pp 721-732) **Development of a single species equation of state for detonation products suitable for hydrocode calculations.** Sentman, L.H.; Strehlow, R.A.; Haeffele, B.; Eckstein, A. (Univ. of Illinois, Urbana). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

A unique set of values for ϵ/k and r^*, the molecular parameters in the JCZ state equations, which give a good representation of the behavior of the explosive products as a single species, has been determined for TNT, PETN and RDX. The single species equivalent values of ϵ/k and r^* were determined by matching the CJ velocity and temperature to the Tiger values over a range of loading densities. Good agreement is obtained between the single species equivalent and the measured isentropes. These single species equivalent JCZ, EOS were incorporated into the Naval Surface Weapons Center's one-dimensional nonsteady hydrodynamic code WUNDY. A model to study the effect of delayed energy addition behind the blast wave was developed and incorporated into WUNDY. In all cases, the near field blast wave for a delayed burn was found to be less intense than the near field blast wave for a Chapman-Jouguet detonation.

54841 (CONF-810602—, pp 735-745) **Low energy laser initiation of single crystals of β-lead azide.** Hagan, J.T.; Chaudhri, M.M. (Cavendish Lab., Cambridge, England). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

Unfocused low-energy Q-switched and non-Q-switched ruby laser irradiation of individual single crystals of β-lead Azide of size 40 μm x 200 μm x 10 mm has been studied using high-speed photography. It was found that the initiation of fast reaction occurs at isolated sites which are probably defects and act as absorption centres in the dielectric which is otherwise transparent to the ruby wavelength of 694.3 nm. It as also been shown that it is the power and not the energy of the incident beam that controls the initiation under these low energy irradiation conditions. Finally, the variation of the time delay to initiation with the incident laser energy suggests a thermal mechanism of initiation.

54842 (CONF-810602—, pp 746-750) **Mesh-initiated large area detonator with magnetic flux compression current generator as source.** Wu, S.; Zhang, G.R. (Beijien Inst. of Tech., China). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

In this paper, the author describes the experimental and theoretical work of a large area mesh-initiated explosive film with

the magnetic flux compression current generator as source. Numerical calculations show that the theoretical results are in accord with that of the experiments.

54843 (CONF-810602—, pp 751-758) **Inverse multi-streak-technique.** Held, M.; Nikowitsch, P. (Messerschmitt-Boelkow-Blohm GmbH, Schrobenhausen, West Germany). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

The Multi-Profile-Streak-Technique or Inverse Multi-Streak-Technique is a method, so far not yet used, which has the specific advantage of revealing the circumferential symmetry of the detonation wave of assembled warheads along the entire warhead length. E.g., this technique permits recording the detonation front of a shaped charge and its velocity to an accuracy of 10 nsec without any impairment to the functioning of the shaped charge. Thus, shaped charge jet formation can be correlated to the precision of the detonation wave front by recording the shaped charge jet by x-ray or synchro-streak technique.

54844 (CONF-810602—, pp 759-767) **Detonation temperature of some liquid explosives.** Burton, J.T.A.; Hawkins, S.J.; Hopper, G. (Ministry of Defence, Essex, England). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

The thermodynamic nature of the products of detonation is briefly discussed. An optical technique for the measurement of the temperature of the detonation front in transparent liquid explosives is described. The intensity of radiation from the explosives at several narrow wavebands across the visible spectrum was measured simultaneously by photomultiplier detectors. Temperature calibration was obtained by the use of a standard tungsten ribbon lamp, and the validity of the technique was supported by measurements of the temperature of the graphite arc under conditions which closely paralleled those of the detonation measurements. The radiation from five liquid explosives was studied and found to be black body in nature. The Chapman-Jouguet (CJ) temperatures were calculated. The results were compared with some predicted values of CJ temperature obtained using equation-of-state models, also with other published experimental values.

54845 (CONF-810602—, pp 768-774) **Brightness temperature of detonation wave in nitromethane-tetranitromethane mixtures and in gaseous mixtures at a high initial pressure.** Kato, Y.; Bauer, P.; Brochet, C.; Bouriannes, R. (Ecole Nationale Superieure de Mecanique et d'Aerotechnique, Cedex, France). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

In order to study the influence of (i) the oxygen ratio and (ii) the density, on the radiative properties of the detonation front, brightness temperature measurements have been performed in nitromethane-tetranitromethane mixtures and also in gaseous hydrocarbon-O_2-N_2 mixtures at high initial pressures. For this purpose, a four-colour pyrometer has been used. The experimental results show that, for the condensed NM-TNM mixtures, the detonation front behaves like a blackbody. The observed results are compared with the calculated ones using several equations of state. For the gaseous mixtures, the brightness temperatures are strongly wavelength-dependent. The experimental values are compared with the calculations using two real gas equations of state.

54846 (CONF-810602—, pp 789-794) **Decomposition reaction kinetics in shock wave front.** Dremin, A.N.; Klimenko, V.Yu.; Michailjuk, K.M.; Trofimov, V.S. (Inst. of Chemical Physics, Chernogolovka, USSR). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

Possibility of the decomposition of some fraction of the explosive inside the shock compression zone is discussed. The calculation results of the thermodynamic parameters distribution for the condensed substance at shock compression are presented. The molecular dynamics methods have been employed. The calculations demostrate the strong nonequilibrium state in the shock compression zone that can give rise to the rapid acceleration of the reaction while compressing. The explosive decomposition initial rate depenence on the front amplitude is obtained, based on the experimental oscillograms of particle velocity at detonation initiation. The depenence has two maxima. A similar result has been obtained based on the experiments dealing with measuring the critical diameter and the shape of the detonation front. The obtained data are interpreted in terms of the assumption that the reaction occurs partially at compressing.

54847 (CONF-810602—, pp 795-800) **Short survey of detonation research in China.** Ding, J. (Beijing Inst. of Tech., China). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

After the founding of the People's Republic of China in 1949, research on detonation in the country has been widely carried out. This paper is intended to give an outline of the work China has done in this field during recent years. Subjects covered include: theory of detonation waves, equation of state and calculation of detonation parameters, overdriven and Mach reflection of detonation waves, shock and laser initiation, detonation measurements, metal acceleration by explosives and numerical simulation. Most of the work mentioned in this paper were presented at the First Symposium on Detonation (China) in 1979.

54848 (CONF-810602—, pp 811-825) **Acceleration of two metal plates in an He-metal sandwich.** Hoskin, N.E.; Lambourn, B.D. (AWRE, Berkshire, England). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

The paper presents an analysis of the problem of the acceleration of two metal plates sandwiching a layer of high explosive which is detonated normally over one of its surfaces. The two assumptions made are (1) that the behaviour of the detonation products can be described by a simple gas law with $\gamma = 3$ and (2) that the two plates are incompressible so that the wave motion within the plates can be disregarded. It is shown that the shocks present are sufficiently weak for the flow to be considered isentropic and furthermore that the whole flow field can be covered by a series of centered simple rarefaction waves and that all parameters defining these waves can be determined iteratively (and analytically). The acceleration of both plates is thus determined and the influence of one plate on the other is discussed.

54849 (CONF-810602—, pp 826-833) **Planar flyer plate driven by detonation product convergent flow.** Tan, B.S.; Jing, F.Q. (Beijing Inst. of Tech., China). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

A device utilizing the detonation product convergent flow to drive a planar flyer plate is described. As compared with non-convergent flow, the velocity of the flyer of such a device may be increased by about 30%, and the shock pressure in target may be increased by about 60% to 70%. This kind of devices has found practical applications in high-pressure equation-of-state measurements. For example, when the main charge is made of RDX and the flyer is made of tungsten, a maximum pressure of about 5.4 Mbar is obtained in a tungsten target. A qualitative description and analysis of the principle of convergent flow and the physical picture of the converging process are also given.

54850 (CONF-810602—, pp 834-840) **Improved approximate model of explosive casing expansion.** Kornhauser, M. (3C Systems, Inc., Wynnewood, PA). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

I.G. Henry has developed an approximate model of expansion of the explosion products and casing, in agreement with the Gurney velocity as the radius approaches infinity. His initial condition of zero velocity, however, does not take into account the substantial casing velocity developed by interaction of the casing with

the detonation wave. In this paper an improved model is synthesized to conform with empirical data on close-in casing velocity and on Gurney velocity, with a constant-gamma expansion in between. The effects of variable gamma and end effects (gas volume not proportional to R squared) are evaluated by comparison of velocity distributions with measured values from standard copper cylinders, and the approximate model is found to fit the data well. Pressure vs. radius and pressure vs. time are predicted on the basis of the improved model.

54851 (CONF-810602—, pp 843-856) **Compaction of porous beds of inert materials.** Sandusky, H.W.; Elban, W.L.; Kim, K.; Bernecker, R.R.; Gross, S.B.; Clairmont, A.R. Jr. (Naval Surface Weapons Center, Silver Spring, MD). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

Dynamic compaction is an important process in the deflagration to detonation transition behavior of porous beds of explosives and propellants. The characteristics of gas-driven dynamic compaction fronts have been studied in porous beds of two inert materials, Teflon 7C and melamine. These compaction fronts closely simulate those occurring during the early stages of DDT. In addition, isolation of compaction phenomena is achieved without any complications arising because of ignition and burning of energetic material. Measurements during the dynamic experiments provided wave and particle velocities, density profiles and pressure data. In separate quasi-static compaction experiments, measurements of applied and transmitted forces permitted an assessment of the intragranular stress and the particle-wall friction parameter versus porous bed density. The relationship for intragranular stress was used as the compaction law in a one-dimensional, two phase hydrodynamic numerical model to simulate successfully two of the dynamic compaction experiments.

54852 (CONF-810602—, pp 865-876) **Characterization of the DDT explosive, CP.** Stanton, P.L. (Sandia National Labs., Albuquerque, NM); Igel, E.A.; Lee, L.M.; Mohler, J.M.; West, G.T. 1981. NTIS, PC A99/MF A01. Contract AC04-76DP00789.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

This report summarizes several studies of the properties of the explosive 2-(5-cyanotetrazolato) pentaamminecobalt (III) perchlorate, called CP. CP is of interest because it undergoes deflagration-to-detonation transition (DDT) within a few millimeters of the point of ignition by a hot wire. The studies include the shock response of the unreacted material, measurements of the detonation parameters, and the equation of state of the reaction products. The peak pressure in the leading wave, identified as the von Neumann spike, is estimated to be 34 GPa, and the C-J pressure is estimated to be 20 GPa for CP at an initial density of 1.75 Mg/m^3. The reaction zone thickness has been observed to be about 0.55 mm thick. Direct observations of DDT are presented.

54853 (CONF-810602—, pp 898-905) **Anomalous burning rate characteristics of composition B and TNT.** Velicky, R.W.; Hershkowitz, J. (Army Armament Research and Development Command, Dover, NJ). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

Burning rates of single large grains of cast and pressed TNT, Composition B and modifications thereof, were measured in a 201 cm^3, 4.76 cm diameter pressure vessel as a function of grain geometry, density, and composition to a pressure of 320 MPa. The three grain geometries for each explosive were solid, right circular cylinders of about 35 grams, and equal weight grains with two different diameter axial holes, but matching outer diameter. The pressure time curves for the three grain geometries of each explosive were found to be essentially the same, i.e., independent of the different curves of surface area versus mass fraction burned for the three geometries which is contrary to the case for propellants, and indicates rate control by an auxiliary mechanism, e.g., mechanical deconsolidation. Each explosive had an early slow burning rate leading to a much more rapid combustion. For cast RDX/TNT, 60/40, with 1% wax or estane added, the transition in dp/dt was very sharp. For pressed Composition B, an increase in density led to a later transition to the higher rate. A single linear burning rate of the form Ap/sup B/ as used for propellants was concluded to have limited validity for explosives.

54854 (CONF-810602—, pp 906-913) **Shock ignition sensitivity of multiply-shocked pressed TNT.** Boyle, V.M.; Pilarski, D.L. (USAARRADCOM, Aberdeen Proving Ground, MD). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

The shock ignition sensitivity of pressed TNT was decreased by shocking it with a leading low pressure wave (0.4 to 1.1 GPa) which was followed within several microseconds by one or two shock waves which gave a maximum pressure of 2.3 GPa. The velocity of the reaction products from the downstream free surface of the impacted TNT was used as a measure of relative reaction. A system is described for producing a series of shocks of increasing amplitude within a target by impacting it with a layered projectile.

54855 (CONF-810602—, pp 914-923) **Effect of base gaps on setback-shock sensitivities of cast composition B and TNT as determined by the NSWC setback-shock simulator.** Myers, T.F. (Naval Surface Weapons Center, Dahlgren, VA); Hershkowitz, J. 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

An extensive series of tests on Composition B and TNT have been conducted using the Naval Surface Weapons Center (NSWC) Setback-Shock Simulator to determine the effect of base gap on sensitivity. The Composition B data were analyzed by consideration of the rate of change of pressure as the principal parameter controlling setback-shock sensitivity and for dependence on pressure as well. For the two-variable dependence, a locus relating p to dp/dt characteristic of the test equipment and the explosive were established using the pooled NO-GO points. This locus separates at the 50% level the NO-GO domain from that for the GOs. The GO points were transposed by (p)(dp/dt)/sup n/ to the test locus, and the distance from the origin on this locus used as a measure of severity of the test required for initiation. Analysis of the Composition B data showed that 0-mil base gap represents significantly less hazard than a 15-mil base gap; a 7-mil base gap represents a significant decrease in hazard over a 15-mil base gap; there is only a small difference in the hazard level between 0-mil base gap and a 7-mil base gap with the lesser hazard for the 0-mil base gap. The number of TNT data points was insufficient for quantitative treatment. Additional points for TNT are currently being obtained. Seven projectiles had a pressure gage mounted in the base supplementing the pressure gage mounted in the plunger acting on the top of the explosive column. The pressure-time curves generated by the two gages corresponded in time, but the base gage had a higher amplitude. The NSWC Setback-Shock Simulator, with the analysis technique presented, is appropriate to the evaluation of relative setback hazard.

54856 (CONF-810602—, pp 924-929) **Exploding foil shock sensitivity test.** Voreck, W.E.; Velicky, R.W. (Army Armament Research and Development Command, Dover, NJ). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

An inexpensive exploding foil driven flyer plate shock sensitivity test has been developed for measuring the sensitivity of explosives to short duration pulses, similar to those produced by detonators. It is particularly useful for evaluating booster explosives, but also, correlated with Lawrence Livermore Laboratory (LLL) critical energy measurements using projectiles with a thin foil face. It is recommended as a supplement or replacement for the NOL-Small Scale Gap Test for testing booster explosives. A second tester is being made for the Navy to evaluate as a potential tri-service requirement for booster explosives. A high voltage, high current pulse from a low inductance 14.5 mfd capacitor is transmitted to a 1 mil aluminum foil (1/4 in. x 0.175 in.) by a parallel plate copper transmission line. The foil is instantly vaporized, and this expanding gas drives a 2 mil Mylar flyer down the barrel to impact the explosive sample pressed into a steel washer. Dimensions and confine-

ment are similar to those in explosive leads. A steel witness disc is used to determine whether the sample detonated or not. The inductance, resistance, and capacity of the system affect results. The present apparatus has L = 140 nh and R = 0.024 ohms. By measuring foil velocity with a streak camera, a calibration against capacitor voltage and burst current was obtained. This can be used to calculate shock pressures independent of the apparatus, however, a good relative rating was obtained by use of the capacitor voltage. Results are correlated with other shock tests for typical booster explosives.

54857 (CONF-810602—, pp 952-957) **Simplified methods for predicting explosive performance parameters including Eremenko's relative detonation impulses.** Short, J.M.; Adolph, H.G.; Kamlet, M.J. (Naval Surface Weapons Center, Silver Spring, MD). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

Detonation pressure, detonation velocity, and an assortment of performance parameters for solid high explosives may be predicted with no other information than elemental composition, loading density, and an estimate of the heat of formation of the explosive. We report simplified methods for calculating explosive performance parameters, including relative detonation impulse. The method reported here is simpler to calculate than Eremenko's correlation for relative detonation impulse.

54858 (CONF-810602—, pp 965-969) **Laboratory scale sensitivity testing of insensitive high explosives.** Brosse, J.M.; Kassel, C.; Michaud, C.; Poulard, S. (Commissariat a l'Energie Atomique, Sevran, France). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

Two laboratory scale tests on insensitive high explosives (like TATB) have been studied using small 10 mm in diameter and 4 mm high pellets of molded and machined explosives. The first test is a confined drop hammer test, the second is a thermal test under pressure. The results of these two tests are compared to other tests using a greater amount of explosive. The drop hammer test results and the Susan Test give parallel results. The small scale thermal test give about the same results as a thermal induction test.

54859 (CONF-810602—, pp 970-975) **Experimental investigation of hot spots produced by high rate deformation and shocks.** Coffey, C.S.; Frankel, M.J.; Liddiard, T.P.; Jacobs, S.J. (Naval Surface Weapons Center, Silver Spring, MD). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

The formation of hot spots is essential to ignition of energetic materials by low level impact or low amplitude shocks. Here we present direct evidence of the generation of hot spots by these low level stimuli in energetic materials. It is shown that shear is the most likely means of hot spot generation by high rate deformation. The process of reaction growth or decay is followed in explosives subjected to low amplitude shocks.

54860 (CONF-810602—, pp 976-985) **Microhardness study of RDX to assess localized deformation and its role in hot spot formation.** Elban, W.L. (Naval Surface Weapons Center, Silver Spring, MD); Armstrong, R.W. 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

An effort has begun to understand the microstructural mechanisms responsible for hot spot formation during impact loading of explosive crystals by measuring the extent of localized plastic deformation and cracking associated with microhardness indentations. RDX and a reference inert, LiF, were selected as materials potentially exhibiting contrasting deformation behavior, based on pressure-time impact observations reported by other investigators. Plastic deformation was found to be considerably more inhomogeneous in RDX, relative to LiF, as evidenced by the more highly localized strain fields and cracking centered on the indentations, as well as, by the larger anisotropy in Knoop hardness numbers. The difference in localized deformation behavior observed for these materials is proposed to relate to their different mechanical responses when impact loaded. Further, it is proposed that the highly localized deformation in RDX relates directly to its propensity for hot spot formation.

54861 (CONF-810602—, pp 987-992) **Flash x-ray cineradiography @ 100,000 FPS.** Trimble, J.J.; Aseltine, C.L. (USAARRADCOM, Aberdeen Proving Ground, MD). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

We have developed a cineradiography technique which will produce six pictures, each on a separate piece of film, with framing rates up to 100,000 frames/second. The system utilizes six 150 keV flash x-ray tubes mounted side by side in one head. X-rays are converted to light by a single x-ray image intensification screen with rapid phosphor decay. The x-ray screen is viewed through six individually adjustable lenses by six, gated image intensifier tubes with light amplification of 15,000. Output from the tubes is recorded on Polaroid film. The x-ray flash duration of 70 nanoseconds per tube determines exposure time.

54862 (CONF-810602—, pp 1004-1009) **Thermocouple temperature measurements in shock initiated PBX-9404.** Bloomquist, D.D.; Sheffield, S.A. (Sandia National Labs., Albuquerque, NM). 1981. NTIS, PC A99/MF A01. Contract AC04-76DP00789.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

A complete understanding of the shock initiation process in high explosives depends on a better knowledge of the temperature behind the shock front. In four experiments, the temperature of shocked PBX-9404 was measured using thin foil thermocouples. The initial pressure ranged from 2.5 to 3.53 GPa. Temperature histories consisted of a rapid rise as the shock passed the gauge, rapid equilibration to a relatively constant temperature, followed by a slower rise attributed to reaction behind the shock. The results indicate that thermal diffusivity in the shocked PBX-9404 is enhanced by as much as five orders of magnitude which may affect the persistence time of hot spots. The initial temperature rise in the shock wave was observed to increase dramatically with stress above a threshold of about 3.0 GPa, indicating that above this threshold the reaction in the shock front becomes significant.

54863 (CONF-810602—, pp 1010-1015) **Raman scattering temperature measurement behind a shock wave.** Boisard, F.; Tombini, C.; Menil, A. (CEA, Belin Beliet, France). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

The validity of equations of state is often in question particularly for weak shock wave (< 20 GPa) for which experimental temperature values disagree with theoretical estimations. The intensities ratio of Raman Stokes and anti-Stokes spectral lines may give an average temperature value in a transparent medium. We present a critical analysis showing that Raman scattering can be a good method to obtain temperature estimation under shock, up to 2500 or 3000 K. An experimental set-up using a YAG or dye laser and a specially designed bichromator is described. With this device, temperature evolution during one microsecond could be obtained. The first results on nitromethane are shown and discussed.

54864 (CONF-810602—, pp 1040-1047) **Factors affecting the explosiveness of munition fillings.** Dyer, A.S.; Hubbard, P.J.; Lee, P.R.; Tisley, D.G. (Royal Armament Research and Development Establishment, Fort Halstead, England). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

The investigation of accidents arising from a wide range of ignition stimuli has developed the understanding of the hazard of potentially explosive systems in terms of sensitiveness and explosiveness. Explosiveness data has been obtained using confined charges ignited by a small propellant/fuzehead ignition system. Both small scale experiments using 300 g of explosive and larger variants using 10 kg of explosive are described. The variation in the

observed response is considered to be related to a fundamental property of the explosive although the additional effects of charge size and confinement are also discussed. The same burning tube test vehicle has been used to examine the response of confined charges in mini fuel fire trials. The response has been shown to be enhanced by the inclusion of an oversize pellet of booster composition adjacent to the sample of main filling composition. A reduction in size of the booster provided immuity for a warhead which had previously detonated in a fuel fire environment.

54865 (CONF-810602—, pp 1048-1054) **Response of confined explosive charges to fragment attack.** Howe, P.M.; Watson, J.L.; Frey, R.B. (USAARRADCOM, Aberdeen Proving Ground, MD). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

An experimental study of the response of confined targets to fragment impact was conducted. Both individual fragment impacts, where case perforation occurs, and plate impacts, which simulate simultaneous, coupled, multiple impacts where no individual perforations occur, were studied. It was found that, for single fragment impacts, ignition results from structural failure of the casing, and is not associated with shock loading nor with heat transfer from the projectile or casing plug. Localized shear deformation of the explosive is considered the most likely cause. Additional single fragment experiments demonstrated that, for the class of heavily confined explosive targets investigated, detonation is not a result of shock initiation. Plate impact experiments showed that case failure occurred by a quite different mechanism from that of single fragment impact. In this instance, case failure does not appear to be the source of ignition, and retards, rather than enhances, the development of violent reactions.

54866 (CONF-810602—, pp 1055-1061) **Numerical study of detonation propagation between munitions.** Howe, P.M.; Huang, Y.K.; Arbuckle, A.L. (USAARRADCOM, Aberdeen Proving Ground, MD). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

The Los Alamos Scientific Laboratory (LASL) 2DE code has been used to simulate numerically the propagation of detonation between collocated, heavily confined explosive charges. Numerical experiments were performed where charge separation and casing wall thickness were varied. Calculations were also performed with plastic shields between rounds. The range of investigation was restricted to small charge separations, where classical shock initiation was expected to dominate propagation, and where case breakup was not expected to invalidate the results. Unreactive acceptor calculations were run to describe the loading. The Forest Fire burn routine was used to provide some estimates of explosive response.

54867 (CONF-810602—, pp 1072-1083) **Lagrange gage studies in ideal and non-ideal explosives.** Cowperthwaite, M.; Rosenberg, J.T. (SRI International, Menlo Park, CA). 1981. NTIS, PC A99/MF A01.

From 7. symposium on detonation; Annapolis, MD, USA (16 Jun 1981).

Lagrange gage and analysis techniques based upon particle velocity measurements were extended and used to characterize the planar shock initiation process in cast TNT and planar steady state detonation processes in cast TNT, Composition B, and the non-ideal explosive Amatex 20. A method for casting Lagrange particle velocity gages into place to minimize flow perturbations caused by target disruptions is described, and a Lagrange analysis which, for the first time, does not model the initial compression of material entering the loading wave as a hydrodynamic discontinuity is presented. The method used to calculate the hydrodynamic flow fields in initiating cast TNT is described in some detail. The results characterize the hydrodynamic flow in this material during initiation, detonation, and partial unloading. The detonation studies in Amatex 20 and Composition B partially resolve the reaction zones in each material. Calculated Chapman-Jouguet parameters and release isentropes are given.

4502 Nuclear

54868 (AD—875968/0) **Relative apparent radii of craters in various soils.** (Defense Atomic Support Agency, Washington, DC (USA)). 20 Oct 1952. 9p. NTIS, PC A02/MF A01.

The report contains the relative apparent radii of craters in various soils, subjected to nuclear explosions.

54869 (AD-A—127120/4) **Magnitude/yield variability in the western United States: analysis of the Rulison/Gasbuggy anomaly. Final report 1 Dec 81-30 Nov 82.** Murphy, J.R.; Archambeau, C.B.; Shah, H.K. (S-Cubed, La Jolla, CA (USA)). Jan 1983. 64p. (SSS-R—83-5978). NTIS, PC A04/MF A01.

An attempt was made to develop a quantitative understanding of the Rulison/Gasbuggy mb/yield anomaly. This effort has encompassed comparative studies of near-regional, regional and teleseismic data recorded from these two explosions, as well as theoretical simulation analysis of selected near-regional and teleseismic data sets. Various hypotheses which have been proposed to explain the mb anomaly, including differences in explosive source coupling, variations in upper mantle attenuation benearth the two test sites and tectonic release effects have been considered and critically evaluated. Analysis of the evidence provided by the near-regional, broadband seismic data recorded from these two explosions indicates that the mb/yield anomaly is not due to differences in explosive source coupling. Evidence is presented which indicates that significatn tectonic release occurred on Rulison, and it is demonstrated that the characteristics of this inferred tectonic release are quantitatively consistent with the obeserved mb/yield anomaly.

54870 (AD-A—129546/8) **Parameter survey for collisionless coupling in a laser simulation of hane (high altitude nuclear explosion). Memorandum report.** Smith, R.A.; Huba, J.D. (Naval Research Lab., Washington, DC (USA)). 1 Jun 1983. 37p. (NRL-MR—5092). NTIS, PC A03/MF A01.

We present a set of criteria for collisionless coupling of debris-air plasmas via the magnetized ion-ion instability (MII) for conditions relevant to the NRL DNA laser experiment. The criteria are based upon (1) a transit time of ions across the coupling shell sufficiently long to allow significant momentum exchange between the debris and air ions; (2) non-stabilization of the MII by electromagnetic effects; (3) a system size sufficiently large to contain at least a target mass of background gas; and (4) allowance for a high beta expansion (i.e., super-Alvenic expansion). A series of figures are presented which display these criteria graphically and indicate the coupling regime for parameters pertinent to the NRL experiment. We conclude that the proposed NRL upgraded facility (e.g., stronger magnetic field and larger target chamber) should be adequate to test the collisionless coupling criteria set forth in Lampe.

54871 (AD-A—130165/4) **Projects GNOME and SEDAN, the PLOWSHARE program. Technical report 1961-1973.** Gravitis, I.; Rohrer, S.; Maag, C.; Shepanek, R. (JRB Associates, Inc., McLean, VA (USA)). 18 Mar 1983. 132p. NTIS, PC A07/MF A01.

This report describes the activities of DOD personnel and other participants in Projects GNOME and SEDAN, the first two nuclear tests of the PLOWSHARE Program. The PLOWSHARE nuclear tests were conducted from 1961 to 1973 at the NTS and other locations. Activities engaging DOD personnel at GNOME and SEDAN included scientific experiments to improve U.S. capabilities in detecting underground nuclear explosions and to determine peacetime uses of nuclear explosives.

4503 Explosion Detection

54872 (AD-A—128396/9) **Attenuation of seismic waves at regional distances. Final technical report 1 Oct 78-30 Sep 82.** Mitchell, B.J.; Nuttli, O.W. (Saint Louis Univ., MO (USA). Dept. of Earth and Atmospheric Sciences). 18 Feb 1983. 78p. NTIS, PC A05/MF A01.

This final report deals in part with the use of regional seismic crustal phases, particularly Lg, to discriminate between explosions and earthquakes, to determine mb values of explosions and earthquakes, and to estimate yields at regional distances. An mb-log yield calibration relation is developed for NTS events, and then used to estimate the yields of selected explosions at the Eat Kazakh test sites in the USSR. The report is further concerned with the attenuation of seismic surface waves at intermediate periods and how the attenuation of those waves is related to that of higher-frequency crustal phases. Significant regional variations of upper crustal Q values are found and higher frequency wave propagate more efficiently than expected on the basis of intermediate-period waves.

54873 **(AD-A—128493/4) Regional discrimination with broadband data. Final report 1 Oct 81-30 Sep 82.** McEvilly, T.V.; Johnson, L.R. (California Univ., Berkeley (USA). Seismographic Station). 4 Feb 1983. 140p. NTIS, PC A07/MF A01.

The research supported by this grant is directed toward the general problems of detection and identification of underground explosions through the study of radiated seismic waves. Particular emphasis is on the collection and analysis of broadband seismic data at near and regional distances. Specific elements of the research program are: (1) recording of broadband data from events at the Nevada Test Site; (2) analysis of the coherence of ground motion near explosions and earthquakes; (3) study of the relative isotropic and non-isotropic components of explosive sources through the application of moment tensor inversion techniques; (4) analysis of regional surface wave data in order to obtain models for the velocity and attenuation in the crust; (5) archival of near and regional data sets which are of value to the general discrimination problem. Section II describes the analysis of array data recorded 1.9 km from the explosion Liptauer in Yucca Valley fo the Nevada Test Site. Section III presents a new way of looking at frequency-wavenumber spectral estimation with array data. Section IV examines the problem that exists when the velocity structure is complicated to the extent that it can be considered to have a random component. Section V treats the problem of scattering of elastic waves by small inhomogeneities. The solution is expressed in terms of a moment tensor expansion of the properties of the scatterer.

50 ENVIRONMENTAL SCIENCES, ATMOSPHERIC

5001 Basic Studies

54874 (NIRS-RSD—50, pp 5-13) **Strontium-90 and cesium-137 in rain and dry fallout; April, 1978 to December, 1978. Radioactivity survey related with environmental and dietary materials.** Sep 1979. NTIS (US Sales Only), PC A03/MF A01.

In Radioactivity survey data in Japan.

The samples of rain and dry fallout, air-borne dust, service water and fresh water, soil, sea water, sea sediment, total diet, rice, milk, vegetables, tea, fish, shellfishes and seaweed, and fresh water fishes, their sampling and prior treatment are described. The methods of separating Sr-90 and Cs-137 and their measurement are explained. The estimations of stable Sr, K and Ca are made by atomic absorption spectroscopy, flame spectrophotometry and potassium permanganate titration, respectively. The general plan of radioactivity survey in Japan is shown. As the environmental data, the results of Sr-90 and Cs-137 in rain and dry fallout obtained from April to December, 1978, and the locations of sampling are given. In a table, the months and the locations of sampling, duration (days), precipitation (mm), and the amounts of Sr-90 and Cs-137 (mCi/km^2) are shown. The maximum values are 0.36 mCi/km^2 of Sr-90 and 0.55 mCi/km^2 of Cs-137 found in Kochi in April, 1978.

54875 (NIRS-RSD—50, pp 14-15) **Strontium-90 and cesium-137 in air-borne dust; April, 1978 to September, 1978. Radioactivity survey related with environmental and dietary materials.** Sep 1979. NTIS (US Sales Only), PC A03/MF A01.

In Radioactivity survey data in Japan.

The samples of rain and dry fallout, air-borne dust, service water and fresh water, soil, sea water, sea sediment, total diet, rice, milk, vegetables, tea, fish, shellfishes and seaweed, and fresh water fishes, their sampling and prior treatment are described. The methods of separating Sr-90 and Cs-137 and their measurement are explained. The estimations of stable Sr, K and Ca are made by atomic absorption spectroscopy, flame spectrophotometry and potassium permanganate titration, respectively. The general plan of radioactivity survey in Japan is shown. As the environmental data, the results of Sr-90 and Cs-137 in air-borne dust obtained from April to September, 1978, and the locations of sampling are given. In a table, the locations and the period of sampling, absorbed volume (m^3), and the amounts of Sr-90 and Cs-137 (10^{-3} pCi/m^3) are shown. The maximum values are 3.7×10^{-3} pCi/m^3 of Sr-90 and 6.3×10^{-3} pCi/m^3 of Cs-137 found in Niigata from April to June, 1978.

54876 **(PB—83-229013) Atlas of source emission particles.** Miller, J.L. (Environmental Protection Agency, Research Triangle Park, NC (USA). Environmental Sciences Research Lab.). Jun 1983. 45p. (EPA—600/3-83-041). NTIS, PC A03/MF A01.

An atlas of various source emission particles characterized by electron optical techniques has been compiled for use by air pollution investigators. The particles studied were emitted by mobile, stationary, and natural sources. Sources included automobiles, manufacturing operations, power plants, smelters, mining and quarring. Filter media and sample preparation methodology as well as morphological and chemical data are presented.

54877 **(UCID—19866) MFR total ozone grid point data.** Ellis, J.S.; Lovill, J.E. (Lawrence Livermore National Lab., CA (USA)). Aug 1983. Contract W-7405-ENG-48. 10p. NTIS, PC A02/MF A01. Order Number DE83017828.

Multichannel filter radiometers (MFR) on four satellites of the Defense Meteorological Satellite Program (DMSP) measured infrared radiances in 16 channels including the 9.6 μm ozone band. The quality of these radiance data and their intercomparisons are discussed. A data base containing the calibrated radiance data and total ozone is archived on 108 magnetic tapes of 6250 bpi density at the National Space Science Data Center (NSSDC), Goddard Space Flight Center, Greenbelt, Maryland. These tapes were written in a packed binary form and are compatible only with a VAX 11/780 series computer.

5002 Chemicals Monitoring And Transport

REFER ALSO TO CITATION(S) 53648, 54134, 54918, 54942

54878 **(BNL—32183) Application of photothermal techniques for trace detection of NO_2 in the troposphere.** Fried, A.; Lin, H.B. (National Bureau of Standards, Washington, DC (USA); Brookhaven National Lab., Upton, NY (USA)). 1982. Contract AC02-76CH00016. 15p. (CONF-8208156—1). NTIS, PC A02/MF A01. Order Number DE83004598.

From NASA workshop; Palo Alto, CA, USA (16 Aug 1982).

Some of the laboratory studies employing photoacoustic and phase-fluctuation optical heterodyne (PFLOHS) detection methods in measuring atmospheric NO_2 are briefly reviewed. Continuing research as well as the important points to be considered for ambient measurements of NO_2 in the troposphere are indicated. 20 references. (ACR)

54879 **(CONF-831063—4) Improved estimates of sulfate dry deposition in eastern North America.** Wesely, M.L.; Shannon, J.D. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 12p. NTIS, PC A02/MF A01. Order Number DE83017909.

From American Institute of Chemical Engineers fall annual meeting; Washington, DC, USA (30 Oct 1983).

Parameterization of the dry deposition of submicron sulfate particles has been improved as the result of numerous field experiments using the micrometeorological technique of eddy correlation. Seasonal sulfate dry deposition computed numerically with a Lagrangian regional-scale model now seem to be slightly smaller than our previous estimates.

54880 **(DOE/ER/60100—T1) Characterization of polynuclear aromatic compounds in petroleum-refining localities. Progress report, September 1, 1982-November 30, 1983.** Warner, I.M. (Emory Univ., Atlanta, GA (USA). Dept. of Chemistry). 1983. Contract AS05-82ER60100. 23p. NTIS, PC A02/MF A01. Order Number DE83017471.

The overall objective of this project is to identify and determine the amounts of polynuclear aromatic compounds that are possibly associated with oil refineries. Our research also involves developing the analytical and air sampling procedures which will be used in our proposed study. In order to obtain the polynuclear aromatic (PNA) content of our samples, several complementary analytical methods have been identified and are being developed to yield the maximum information about the PNA content of our samples. These methods include separation techniques such as gas and liquid chromatography (GC and LC), detection techniques such as mass spectroscopy (MS), video fluorometry (VF), as well as combined techniques such as GC/MS and LC/VF. The air sampling techniques include particle sampling using high volume air samplers with and without cascade impactors and vapor phase sampling using solid absorbing resins. The analytical methods that we are applying to the identification and determination of PNAs at trace levels in oil refining localities appear to be quite effective. These preliminary studies indicate that PNAs are found in and around oil refinery localities using high volume sampling procedures. However, the concentration level of pollutants found appear to be very low when compared to background samples taken at a Texas Air Control sampling station. Further studies are continuing with particular emphasis on the analysis of vapor phase samples using the adsorbing resins described previously. 5 references, 1 figure, 7 tables.

54881 **(DOE/NBB—0040) Response of the North American corn belt to climatic warming, CO_2.** (Union Carbide Corp., Oak Ridge, TN (USA). Nuclear Div.). Aug 1983. Contract W-7405-ENG-26. 30p. NTIS, PC A03/MF A01. Order Number DE83017873.

The climate of the North American corn belt was characterized to estimate the effects of climatic change on that agricultural region. Heat and moisture characteristics of the current corn belt were identified and mapped based on a simulated climate for a doubling of atmospheric CO_2 concentrations. The result was a map of the projected corn belt corresponding to the simulated climatic change. Such projections were made with and without an allowance for earlier planting dates that could occur under a CO_2-induced climatic warming. Because the direct effects of CO_2 increases on plants, improvements in farm technology, and plant breeding are not considered, the resulting projections represent an extreme or worst case. The results indicate that even for such a worst case, climatic conditions favoring corn production would not extend very far into Canada. Climatic buffering effects of the Great Lakes would apparently retard northeastward shifts in corn-belt location.

54882 **(PB—83-194019) Iowa air quality report 1981. Annual report.** (Iowa Dept. of Environmental Quality, Des Moines (USA). Air and Land Quality Div.). Dec 1982. 84p. NTIS, PC A05/MF A01.

Iowa's air monitoring data from 1957 to 1981 have been compiled in this report for seven pollutants monitored in the State: suspended particulate matter, sulfur dioxide, nitrogen dioxide, carbon monoxide, non-methane hydrocarbons, ozone and lead. The data are presented in tabular form for each pollutant. Additional sections discussing the pollutants and pollutant sources, the air monitoring network, and the analysis of data and trends have been added.

54883 **(PB—83-195826) Los Angeles field modeling and measurement study - 1976 (first year). Final report.** Richards, L.W.; Whitby, K.T.; Cantrell, B.K.; McKenzie, R.L.; Barsic, N.J. (Rockwell International Corp., Newbury Park, CA (USA). Environmental Monitoring and Services Center). Apr 1983. 206p. NTIS, PC A10/MF A01.

In October 1976 a two-week field program was conducted in Los Angeles to evaluate in the field existing measurement methods for ambient concentrations of sulfuric acid aerosol and related sulfates, and to obtain preliminary data for the in-roadway concentrations of sulfates due to catalyst equipped vehicles. Scatter diagrams show that the in-roadway increments of NOx, CO, SO2 and several aerosol physical parameters do not correlate well. The statistical design of an in-roadway sampling program to determine distribution functions for the exposure of the Los Angeles population to elevated concentrations of vehicle exhaust pollutants is described.

54884 **(PB—83-195834) Los Angeles field modeling and measurement study - 1978 (second year). Final report.** Richards, L.W.; Johnson, K.R. (Rockwell International Corp., Newbury Park, CA (USA). Environmental Monitoring and Services Center). Apr 1983. 144p. NTIS, PC A07/MF A01.

An instrumented van was used to collect size-segregated aerosol samples and measure sulfur dioxide and ammonia concentrations on the heavily-traveled Ventura Freeway in Los Angeles while a nearby identical van in radio contact sampled upwind. Measurements were made on a few unusually clean days in October 1978 and February 1979 so that the in-roadway sulfate increment (freeway minus upwind background) could be detected. Sulfuric acid emissions were easily measured behind a new, catalyst-equipped vehicle using fuel with 10 times the California average sulfur content.

54885 **(PB—83-195958) Ambient hydrocarbon and ozone concentrations near a refinery. Final report.** Sexton, K.; Westberg, H.H. (Washington State Univ., Pullman (USA). Air Resources Section). Apr 1983. 294p. NTIS, PC A13/MF A01.

An ambient air monitoring study to characterize airborne emissions from petroleum refineries was conducted near the Marathon oil refinery at Robinson, Illinois during June 17 - July 29, 1977. Ground-level sampling facilities and an airplane equipped with air pollutant monitoring instruments provided an integrated, three-dimensional monitoring network. Measurements made during the study included ozone, oxides of nitrogen, sulfur dioxide, methane, carbon monoxide, individual C2-C10 hydrocarbons, halocarbons, condensation nuclei, visual distance and various meteorological parameters.

54886 **(PB—83-217331) CO_2-recovery from flue gases.** Keyser, R.E.; de Jong, E.J.; Kuijvenhoven, L.J. (Technische Hogeschool Delft (Netherlands). Afdeling der Werktuigbouwkunde). Oct 1979. 97p. NTIS, PC E05/MF E01.

This report evaluates the economics of the recovery of 370 metric tons per day of CO_2 from flue gases exiting a natural gas fired reformer system. The CO_2 must be delivered to the plant battery limits at 20.7 kg/sq. cmg, 38 C and saturated with water. Flue gas available from reformer system is 4226 k mol/hr at 0.14 kg/sq. cmg and 160C and has the following composition: N_2: 68.67 mol %, CO_2: 8.46 mol %, O2: 2.74 mol %, Ar: 0.89 mol %, and H2O: 19.24 mol %.

54887 **(PB—83-231324) Mechanism and rates of the gas phase oxidations of sulfur dioxide and the nitrogen oxides in the atmosphere.** Calvert, J.G.; Stockwell, W.R. (Ohio State Univ., Columbus (USA). Dept. of Chemistry). Jul 1983. 100p. NTIS, PC A05/MF A01.

As our knowledge of the atmospheric chemistry of the SO_2, NO, and NO_2 continues to grow, it becomes increasingly clear that many different chemical reactions contribute to the oxidation of these oxides in the atmosphere. Solution phase and gas phase chemistry are both important to acid rain development, and gas-solid, gas-liquid, liquid-solid as well as simple gaseous molecule interactions are seemingly important in some circumstances as well. The evaluation of the mechanism and rates of solution phase and heterogeneous pathways for SO_2 and NOx oxidation within the troposphere, the significance of surface removal processes, and the transport and diffusion processes are much less amenable to simple laboratory studies and quantification. Although a significant wealth of important and necessary information related to SO2 and NOx chemistry has been defined in recent years and a reasonable depth of knowledge of the many fundamental gas phase processes exists today, many uncertainties still remain in this, the simplest of the research areas related to acid rain development.

54888 **Trace element and radionuclide mass balances at a coal-fired electric generating station.** Klusek, C.S.; Miller, K.M.; Heit, M. (Dept. of Energy, New York, NY). *Environment International;* 9: 139-144(1983).

Coal, bottom ash, and fly ash from Milliken Station, a coal-fired 270 MW power plant, were analyzed for 20 elements (Ag, Al, As, Be, Cd, Co, Cr, Cu, Ga, Hg, Mn, Ni, Pb, Sb, Se, Sn, Te, Tl, V, and Zn) and the major natural radionuclides (^{238}U series, ^{232}Th series, and ^{40}K). Mass balance calculations showed that most of the Hg, and some of the Sb and Se, were unaccounted for by ash collection, suggesting their possible discharge into the atmosphere. Silver, As, Hg, Pb, Cd, and Zn were more concentrated in the fly ash than in the bottom ash while all of the other elements were equally distributed, by concentration, between the ash fractions. The radionuclides showed a 46% higher concentration in fly ash than in bottom ash, and ^{210}Pb was enriched in the fly ash relative to the other radionuclides by a factor of 2.4. Mass balance calculations indicated a balance within statistical error for the radionuclides, except for ^{210}Pb.

54889 **Apparatus and method for quantitative determination of materials contained in fluids.** Radziemski, L.J.; Cremers, D.A. US Patent Application 6-415,515. 7 Sep 1982. 19p. Contract W-7405-ENG-36.

Apparatus and method for near real-time in-situ monitoring of particulates and vapors contained in fluids are described. Initial filtration of a known volume of the fluid sample is combined with laser-induced dielectric breakdown spectroscopy of the filter employed to obtain qualitative and quantitative information with high sensitivity. Application of the invention to monitoring of beryllium, beryllium oxide, or other beryllium-alloy dusts is shown. Significant shortening of analysis time is achieved from the usual chemical techniques of analysis.

54890 **Total airborne mercury and its possible origin.** Brosset, C. (Swedish Water and Air Pollution Research Inst., Gothenburg, Sweden). *Water, Air, and Soil Pollution;* 17: No. 1, 37-50(Jan 1982).

Total airbone Hg as well as black particles (soot) were monitored in a number of clean air areas in Sweden. For some of the sampling sites, back trajectories for air movements at 850 mb were provided by the Norwegian Meteorological Institute. It is shown that the total Hg in air may be divided into two fractions. The most important one may be considered to be a background and is probably the result of re-emission of Hg by the ground and by natural water. The other fraction is highly dependent on wind direction in the same way as black particles. This fraction seems to be of anthropogenic origin.

54891 **Source reconciliation of atmospheric aerosols.** Stolzenburg, T.R. (Univ. of Wisconsin, Madison); Andren, A.W.; Stolzenburg, M.R. *Water, Air, and Soil Pollution;* 17: No. 1, 75-85(Jan 1982).

Multivariate regression analysis was used to determine the major emission sources contributing to suspended particulates in air collected over a small mixed land use watershed. Aerosol samples were collected at 5 different land use types in 1976 and 1977 and analyzed for 10 elements. Aerosol composition was then compared to emission source composition to obtain the relative contribution by each emission source. Two examples of source reconciliation by multivariate regression analysis for typical samples are given. An industrial land use type clearly shows increased contributions from anthropogenic activity when compared to a rural site only 15 km distant in a crosswind direction. Differences in calculated and measured ambient aerosol concentrations can lead to specific interpretations about emission sources. The implications of errors in concentration data are discussed. A weighting technique can aid in correcting problems caused by incomplete or inaccurate data for 1 or 2 elements.

54892 **Estimates for the long-range transport of air pollution.** Slinn, W.G.N. (Pacific Northwest Lab., Richland, WA). *Water, Air, and Soil Pollution;* 18: 45-64(1982). Contract AC06-76RL01830.

Different atmospheric, source, and surface conditions can result in substantially different ranges of atmospheric transport of air pollutants; for example, even for anthropogenic S and N, the ranges can vary from about 10^1 to 10^6 km. In this report, the emphasis is on dictating some of the reasons for the great variability of these ranges. Thus, some of the complexities of dry deposition, atmospheric chemistry, and precipitation scavenging are described, and it is demonstrated how synoptic-scale meteorologic conditions can control both dry and wet deposition. On the other hand, it is suggested that the mean, tropospheric-residence time of particulate S and N from fossil-fuel combustion in temperate latitudes is probably about a week, but the amount of this material remaining airborne after a week can be large, since the amount is expected to have a log-normal distribution over an ensemble of realizations. Applications of the results to the U.S./Canadian acid-rain issue, to episodic-deposition events, and to global-scale atmospheric pollution are indicated.

54893 **Estimation of wet and dry deposition of pollutant sulfur in eastern Canada as a function of major source regions.** Shannon, J.D. (Argonne National Lab., IL); Voldner, E.C. *Water, Air, and Soil Pollution;* 18: 101-104(1982).

The contributions of major anthropogenic source regions to wet and dry deposition of total S in eastern Canada are estimated for a winter month and a summer month with the ASTRAP model. Results indicate that the U.S. and Canada contribute approximately equal amounts to total S deposition in Canada; Canadian sources contribute more than one half of dry deposition and less than one half of wet deposition.

54894 **Impact of New York state emission sources on Class 1 areas.** Sistla, G.; Domaracki, A.J.; Putta, S.N. (New York State Dept. of Public Service, Albany). *Water, Air, and Soil Pollution;* 18: 123-128(1982). Contract AC06-76RL01830.

The ARL-ATAD (Air Resources Laboratory-Atmospheric Transport and Dispersion) Model is used to calculate trajectories of air parcels leaving New York City, Albany, and Buffalo airshed regions and terminating near Federally-mandated Class 1 areas in the Northeastern United States, for which visibility is protected from degradation under the Clean Air Act. The purpose of this study is to provide an estimate of the frequency of occurrence of trajectory end points terminating over or near these environmentally sensitive regions from data for a one year period. Results indicate that these regions are not substantially effected by the air parcels either on an annual or seasonal basis.

54895 **Effects of varying air trajectories on spatial and temporal precipitation chemistry patterns.** Raynor, G.S.; Hayes, J.V. (Brookhaven National Lab., Upton, NY). *Water, Air, and Soil Pollution;* 18: 173-189(1982). Contract AC02-76CH00016.

This study was designed to determine if judicious use of synoptic data and an operational trajectory model could identify probable source regions of anthropogenic pollutants in northeastern United States precipitation and thus relate receptor measurements to emissions data without consideration of the complex intervening meteorological and chemical processes. The storm event of April 8 to 10, 1979, was selected for intensive study. Precipitation chemistry data were obtained from event samples at six MAP3S sampling sites and from hourly samples at Brookhaven National Laboratory. Concentrations of hydrogen, sulfate, nitrate and ammonium ions were used as receptor data. Some emissons data for SO/sub x/ and NO/sub x/ were obtained from the MAP3S emissions inventory. Surface and upper air meteorlogical data were analyzed. Backward trajectories ending at each of the sampling sites during the precipitation period were computed with the Heffter Interactive-Terminal Transport Model using selected transport layers. Results show that concentrations of pollutant species in event precipitation samples were much higher at stations at end points of trajectories passing through the Ohio River valley than at stations with other trajectories. Likewise, concentrations at Brookhaven were much higher during the end period of a trajectory through the same region than with more northerly and more southerly tracks. The model produced back trajectoires consistent with synoptic flows. Concentrations of air pollutants in precipitation were roughly proportional to the number of major pollutant sources along the trajectory.

5003 Radioactive Materials Monitoring And Transport

REFER ALSO TO CITATION(S) 53467, 53603, 54874, 54875, 54919, 55035

54896 (ARL/TR—050, pp 149-150) **Environmental radiation monitoring.** Duggleby, J.C.; Smith, P.A.; Lauder, R.A.; Dixon, G. Jan 1983. NTIS (US Sales Only), PC A08/MF A01.

In Annual review of research projects 1981.

The ARL's radiation monitoring program is outlined. This includes the surveillance for the early detection of fresh fission products in ground-level air, monitoring during visits by nuclear powered warships and measurement of long-lived radionuclides. The radioactive fallout in Australia from nuclear weapons tests in the atmosphere has been monitored on a continuous basis since the 1950s but since 1974 the extent of this program has been reduced.

54897 (CONF-830101—, pp 455-460) **Sampling strategies for indoor radon investigations.** Prichard, H.M. (Univ. of Texas, Houston). 1983. NTIS, PC A24/MF A01.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

Recent investigations prompted by concern about the environmental effects of residential energy conservation have produced many accounts of indoor radon concentrations far above background levels. In many instances time-normalized annual exposures exceeded the 4 WLM per year standard currently used for uranium mining. Further investigations of indoor radon exposures are necessary to judge the extent of the problem and to estimate the practicality of health effects studies. A number of trends can be discerned as more indoor surveys are reported. It is becoming increasingly clear that local geological factors play a major, if not dominant role in determining the distribution of indoor radon concentrations in a given area. Within a giving locale, indoor radon concentrations tend to be log-normally distributed, and sample means differ markedly from one region to another. The appreciation of geological factors and the general log-normality of radon distributions will improve the accuracy of population dose estimates and facilitate the design of preliminary health effects studies. The relative merits of grab samples, short and long term integrated samples, and more complicated dose assessment strategies are discussed in the context of several types of epidemiological investigations. A new passive radon sampler with a 24 hour integration time is described and evaluated as a tool for pilot investigations.

54898 (NIRS-RSD—50) **Radioactivity survey data in Japan.** (National Inst. of Radiological Sciences, Chiba (Japan)). Sep 1979. 32p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83781082.

Items within the scope of EDB have been entered individually into the data base. (ACR)

54899 **Computation of radionuclide particulate finite area fugitive source strengths.** Fields, D.E. (Oak Ridge National Lab., TN). *Health Physics;* **44**: No. 6, 653-655(Jun 1983). Contract W-7405-ENG-26.

Computation of risks from exposures to suspended particulates is required for both nuclear and nonnuclear assessments. This computation is often quite challenging due to the contribution from the resuspension of previously deposited material. This material may be resuspended by wind or by other mechanical disturbance and may constitute a significant source term leading to local and downwind exposures. The release rate into the atmosphere is termed the source strength. A source strength must be known if downwind atmospheric concentration values are to be determined. Most previously developed numerical models of atmospheric transport parameterize resuspension as a steady-state variable. The algorithm used is suitable only for sources of very large extent. The procedure the author develops here, a time-dependent parameterization suitable for finite sources, has been implemented in a recent transport and risk assessment model.

54900 **Radon-222 and progeny measurements in typical east Tennessee residences.** Goldsmith, W.A.; Poston, J.W.; Perdue, P.T.; Gibson, M.O. (Oak Ridge National Lab., TN). *Health Physics;* **45**: No. 1, 81-88(1983). Contract W-7405-ENG-26.

Modified Wrenn chambers for continuous monitoring of ^{222}Rn, featuring several improvements including a computer-assisted electronics package, have been developed at the Oak Ridge National Laboratory. A field test of these instruments was conducted by placing them in the homes of staff members. Field testing was conducted in seven houses for periods ranging from 4 to 18 days. During this testing period, the ^{222}Rn concentration in these houses was monitored continuously. Radon-222 concentrations in the basements of three of the seven houses were in excess of 100 Bq/m^3 almost continuously. Samples of soil and building materials from these residences indicated that ^{226}Ra concentrations were in the normal range (40 Bq/kg). Radon progeny measurements were made in five of these houses on a typical day. This paper summarizes the results obtained in the field test.

5004 Thermal Effluents Monitoring And Transport

REFER ALSO TO CITATION(S) 54149

5005 Site Resource And Use Studies

REFER ALSO TO CITATION(S) 53689

54901 (PB—83-212043) **Ohio River Valley Study. Sites, methods, data summary for 1980. Volume 1. Main report. Report, October 1979-December 1980.** Shaw, R.W.; Paur, R.J.; Royal, T. (Mead Technology Labs., Research Triangle Park, NC (USA)). May 1983. 104p. NTIS, PC A06/MF A01.

The Ohio River Valley Study was initiated to gather air quality data at sites representative of regional conditions in an area where current coal usage and projected increases are exceptionally large. These data were intended for use in developing source apportionment calculations to attempt to identify species contributing to fine and coarse particle mass and to identify the major pollution sources responsible for these ambient particles. Special emphasis was also directed to chemical and physical analysis of the aerosols and gases to estimate the impact of emissions from coal-fired power plants on air quality at these Ohio River Valley monitoring sites. This report describes procedures for site location and for station preparation, operation, and periodic audits. Data summaries are presented for the period May through December 1980.

54902 (PB—83-212050) **Ohio River Valley Study. Sites, methods, data summary for 1980. Volume 2. Appendices. Report for Oct 79-Dec 80.** Shaw, R.W.; Paur, R.J.; Royal, T. (Mead Technology Labs., Research Triangle Park, NC (USA)). May 1983. 361p. NTIS, PC A16/MF A01.

The Ohio River Valley Study was initiated to gather air quality data at sites representative of regional conditions in an area where current coal usage and projected increases are exceptionally large. This report describes procedures for site location and for station preparation, operation, and periodic audits. Data summaries are presented for the period May through December 1980. Measurements included atmospheric concentrations of nitrogen oxides, sulfur dioxide, ozone, and peroxyacetyl nitrate; local meteorology; aerosol mass and composition; total suspended particulate; and precipitation. Special analysis for speciation of sulfur aerosols began in December 1980. Measurements of nitric acid and ammonia were made during the summer of 1981; results will be presented in a subsequent report.

5006 Regulations

REFER ALSO TO CITATION(S) 54894, 54960

54903 **(DOE/NBB—0044) NO/sub x/ information book.** (Argonne National Lab., IL (USA); Brookhaven National Lab., Upton, NY (USA); Pacific Northwest Lab., Richland, WA (USA); Energy Impact Associates, Inc., Pittsburgh, PA (USA)). Mar 1983. Contract AC02-76CH00016;AC06-76RL01830;W-31-109-ENG-38. 314p. NTIS, PC A14/MF A01. Order Number DE83017899.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The NO/sub x/ Information Book contains a summary of scientific and technological knowledge about oxides of nitrogen pertinent to air pollution control issues, a discussion of regulatory activities concerning nitrogen oxides (NO/sub x/) and their potential impacts on energy development. Each chapter has a brief introduction followed by short discussion of topics and subtopics. Additional information and data supporting the discussion are presented. Some near-term issues discussed in NO/sub x/ control include: increased attention to the role of NO/sub x/ in influencing the acidity of precipitation through oxidant formation; decreased prospects for a short-term NAAQS for NO/sub x/ emission from new vehicles. The role of NO/sub x/ in formation of photochemical oxidants continues to be an issue. Background information pertinent to these developments is included in relevant sections. However, information on the effects of the reaction products of NO/sub x/ is treated in less detail than on those of NO/sub x/.

54904 **(PB—83-210633) National Performance Audit Program. Ambient air audits of analytical proficiency, 1981.** Bennett, B.I.; Lampe, R.L.; Porter, L.F.; Hines, A.P.; Puzak, J.C. (Environmental Protection Agency, Research Triangle Park, NC (USA). Environmental Monitoring and Systems Lab.). Apr 1983. 43p. NTIS, PC A03/MF A01.

This report presents the results of the U.S. Environmental Protection Agency's 1981 National Audit Program, which are summarized by pollutant and by analytical method. Semiannual audits were conducted for SO_2 and NO_2, Pb, NO_3^{-2} and SO_4^{-2} and CO_2. One audit was conducted on high-volume flow rate. Continuous SO_2 monitors were audited throughout the year, such that no monitor was audited more than once. Approximately 60 laboratories participated in each SO_2 bubbler audit and 50 in each NO_2 bubbler audit. Approximately 60 laboratories participated in each SO_4^{-2} audit, 50 in each NO3(negative 2) audit and 97 in each Pb audit. Approximately 380 CO monitors were checked in each CO audit and 159 continuous SO_2 monitors were checked throughout the year. A total of 1,462 flow devices were audited. Approximately 6 percent of the overall results were retected as statistical outliers. This value is consistent with that observed in previous audits.

54905 **(PB—83-225938) SO_2 abatement for coal-fired boilers in Japan. Final report Jun 81-Jan 83.** Ando, J. (Chuo Univ., Tokyo (Japan)). May 1983. 244p. NTIS, PC A11/MF A01.

The report is a compilation of information on the current status of SO_2 abatement technologies for coal-fired boilers in Japan, where strict ambient air quality standards for SO_2 and NOx mandate the use of various air pollution control technologies. It focuses on flue gas desulfurization (FGD) and is based on information gathered from utility company representatives and FGD process developers and the author's research in the field. Various technologies including wet lime/limestone and indirect lime/limestone FGD processes and combined FGD/Selective Catalytic Reduction (SCR) systems are described in terms of process descriptions, development and/or commercial application status, and economics. Detailed operating data are given for many of the processes.

51 ENVIRONMENTAL SCIENCES, TERRESTRIAL

5101 Basic Studies

54906 (NIRS-RSD—50, pp 24-26) **Strontium-90 and cesium-137 in soil: April 1978 to March 1979. Radioactivity survey related with environmental and dietary materials.** Sep 1979. NTIS (US Sales Only), PC A03/MF A01.

In Radioactivity survey data in Japan.

The samples of rain and dry fallout, air-borne dust, service water and fresh water, soil, sea water, sea sediment, total diet, rice, milk, vegetables, tea, fish, shellfishes and seaweed, and fresh water fishes, their sampling and prior treatment are described. The methods of separating Sr-90 and Cs-137 and their measurement are explained. The estimations of stable Sr, K and Ca are made by atomic absorption spectroscopy, flame spectrophotometry and potassium permanganate titration, respectively. The general plan of radioactivity survey in Japan is shown. As the environmental data, the results of Sr-90 and Cs-137 in soil obtained from April, 1978, to March, 1979, and the locations of sampling are given. In a table, the months, the locations and the depth (cm) of sampling, air soil (%), Sr (%), and the amounts of Sr-90 and Cs-137 (pCi/kg and mCi/km^2) are shown. The maximum values are 83 mCi/km^2 of Sr-90 and 150 mCi/km^2 of Cs-137 found in Akita in July, 1978.

54907 (NIRS-RSD—50, pp 27-29) **Strontium-90 and cesium-137 in total diet; April, 1978 to March, 1979. Radioactivity survey related with environmental and dietary materials.** Sep 1979. NTIS (US Sales Only), PC A03/MF A01.

In Radioactivity survey data in Japan.

Samples should be meals to be eaten daily. Avoid meals specially prepared. One sample should consist of breakfast, lunch, supper, and snacks (tea and water are inclusive) for five persons per day. The stuff is carbonized under direct fire on a large-sized stainless plate. Take care not to raise smoke. The carbide is moved on to a porcelain dish and then ashed at 500°C in an electric oven. The results obtained from April 1978 to March 1979 were shown in a table.

54908 **(PB—83-225102) Initial study of wild horse and burro demography: determination of pregnancy and lactation rates in various herds. Final report.** Wolfe, M.L.; Ellis, L.C. (Utah Univ., Salt Lake City (USA)). 30 Nov 1982. 52p. NTIS, PC A04/MF A01.

Blood serum concentrations of reproductive hormones were used to estimate pregnancy rates in 558 wild and free-roaming horses (Equus caballus) from Nevada, Oregon, and Wyoming; and 165 burros from California. Levels of progesterone, pregnant mares' serum gonadotropin (PMSG), and estradiol 17B were determined by radioimmunoassay procedures. Based on comparison with the results of pregnancy diagnosis from rectal palpations (n =124), the following endocrine concentrations were established as criteria sufficient to indicate pregnancy: progesterone, 0.05 ng/ml; and/or PMSG, 3.0 mg/ml; and/or estradiol, 300 pg/ml. Estimated accuracy of pregnancy diagnoses from endocrine criteria was 80 to 85 percent. The mean incidence of pregnancy among mares sampled from Nevada, Oregon, and Wyoming was 58.4 percent, 69.2 percent, and 85.3 percent respectively.

5102 Chemicals Monitoring And Transport

REFER ALSO TO CITATION(S) 53648, 54942

54909 **(CONF-8308115—1) Combined effects of atmospheric deposition, internal acid production, and harvesting on nutrient gains and losses from forest ecosystems.** Johnson, D.W.; Richter, D.D. (Oak Ridge National Lab., TN (USA)). 1983. Contract W-7405-ENG-26. 29p. NTIS, PC A03/MF A01. Order Number DE83017133.

From US/Canadian conference on forest responses to acidic deposition; Orono, ME, USA (3 Aug 1983).

Atmospheric deposition can cause nutrient gains (N, S) or losses (Ca, Mg, K) from forest ecosystems whereas harvesting causes only losses. Available data indicate that S deposition in polluted regions greatly exceeds S export via whole-tree harvesting, but this is not normally the case for N. Both atmospheric acid deposition (in concert with internal acid production) and harvesting can cause the loss of base cations, but because of tree selectivity in cation uptake, it appears that harvesting will have a greater impact on the export of scarce or limiting cations than will acid deposition or internal acid generation. However, nutrient losses via harvesting can be minimized by timing harvests and losses can be compensated for by proper fertilization under intensive management regimes. 57 references.

54910 **(PB—83-206961) Hazardous waste landfill research.** Schomaker, N.B. (Environmental Protection Agency, Cincinnati, OH (USA). Municipal Environmental Research Lab.). May 1983. 30p. (EPA—600/D-83-045). NTIS, PC A03/MF A01.

The hazardous waste land disposal research program is collecting data necessary to support implementation of disposal guidelines mandated by the 'Resource Conservation and Recovery Act of 1976' (RCRA) PL 94-580. This program relating to the categorical area of landfills, surface impoundments, and underground mines encompasses state-of-the-art documents, laboratory analysis, economic assessment, bench and pilot studies, and full scale field verification studies. Over the next five years the research will be reported as Technical Resource Documents in support of the Permit Writers Guidance Manuals. These manuals will be used to provide guidance for conducting the review and evaluation of land disposal permit applications. This paper will present an overview of this program and will report the current status of work in the various categorical areas.

54911 **(PNL-SA—10870) Detecting long-term ecological effects in forests and food chains.** Hinds, W.T. (Pacific Northwest Lab., Richland, WA (USA)). Oct 1982. Contract AC06-76RL01830. 3p. NTIS, PC A02/MF A01. Order Number DE83003469.

The objectives are to examine the fundamentals of cost-effective long-term monitoring and to develop methods appropriate for western ecosystems. Now nearing completion are optimized field measurements for two contrasting situations, old-growth forests and terrestrial predation in shallow aquatic habitats. The report presents the approach and methodology used in this fundamental research into long-term effects detection.

54912 **Accumulation of atmospherically deposited metals in wetland soils of Sudbury, Ontario.** Taylor, G.J.; Crowder, A.A. (Queen's Univ., Ontario, Canada). *Water, Air, and Soil Pollution;* **19**: No. 1, 29-42(Jan 1983).

Concentrations of Cu, Ni, Fe, and Mg in soil/sediment from 25 wetlands in the Sudbury, Ontario, region decline logarithmically with increasing distance from several ore smelters. Total Cu and Ni reach concentrations potentially toxic to plant life in soil/sediment material near the smelters. Despite random variation in soil/sediment pH and Eh, NH_4OAc extractable Cu, Ni and Fe, and DTPA extractable Cu, Ni and Mg show the same pattern as total Cu, Ni, Fe, and Mg. The failure of DTPA extractable Fe to show the same pattern as total Fe may be due to the inadequacy of the DTPA soil test when testing Fe in acid soils. Soil/sediment organic C content increases with distance from the smelters, but is unrelated to pH or Eh.

54913 **A timesaving technique for measuring respiration rates in incubated soil samples.** Edwards, N.T. (Oak Ridge National Lab., TN). *Soil Science Society of America Journal;* **46**: No. 5, 1114-1116(Sep 1982). Contract W-7405-ENG-26.

A method for determining CO_2 efflux rates from large soil samples (50 to 200 g) is described. The method permits the measurement of cumulative CO_2 efflux from large numbers of incubated samples in about 2 min/sample. The apparatus includes a CO_2 scrubber, soil incubaion jars, flow meter, drying column, dilution jar, and infrared gas analyzer. Results obtained using this method were less variable than results obtained with a Gilson differential respirometer when a homogeneous forest soil sample was tested.

54914 **Nitrate distribution in Mojave Desert soils.** Hunter, R.B.; Romney, E.M.; Wallace, A. (Univ. of California, Los Angeles). *Soil Science;* **134**: No. 1, 22-30(Jul 1982). Contract AC03-76SF00012.

Extensive sampling shows high variability in nitrate concentration within profiles of Mojave Desert soils. This high variability greatly complicates studies of desert soil N and its ecological role. Patterns in nitrate distribution suggest effects of litter decomposition under shrubs, surface leaching in bare areas, and plant uptake in the root zone. Two mechanisms proposed to explain high concentrations found at seemingly random depths are concentration at drying fronts and distribution along water potential gradients.

54915 **The potential acidity associated with dews, frosts, and fogs.** Wisniewski, J. (Flow General Inc., McLean, VA). *Water, Air, and Soil Pollution;* **17**: No. 4, 361-377(May 1982).

Acidity associated with special meteorological events such as dews, frosts, and fogs may cause significant environmental effects ranging from increased leaching of plant metabolites to material corrosion. In addition, dews, frosts, and fogs occur with much greater frequencies than rain or snow in most areas. Due to these facts, a theoretical study was conducted to determine the potential acidity associated with these events. Results from the study showed the potential acidity associated with these events to be significant. Values of fog pH are extremely sparse, but indicate that they are slightly acidic. However, these experiments have probably underestimated the actual acidic potential of dew and frost. Theoretical calculations indicate that synergistic acidity from dew or frost in combination with dry deposition may result in very strong localized acidities.

54916 **Clay minerals in Northern Plains coal overburden as measured by X-ray diffraction.** Klages, M.G.; Hopper, R.W. (Montana State Univ., Bozeman). *Soil Science Society of America Journal;* **46**: No. 2, 415-419(Mar 1982).

Mathematical models were tested for changing x-ray diffraction data to percentages of clay minerals in coal overburden. Various factors for adjusting peak areas were tested on 50 eastern Montana samples that contained smectite, illite, and daloinite, with lesser amounts of other minerals. Cation exchange capacities (CEC) of the clays were estimated from the calculated mineral percentages and correlated against measured CEC. The best model gave in r^2 of 0.89. It was used for estimating clay mineralogy at six mine sites in the Northern Great Plains. Average mineral contents in the surface 8 to 38 m of five of seven drill holes in the Montana-Wyoming border area were 40% smectite, with 20% each of illite and kaolinite. Clays from greater depths in the same area had no smectite and an average of 50% each of illite and kaolinite. All samples from a mine in central North Dakota were high in swelling clay, with an average of 60% smectite and 10% vermiculite.Samples from four holes at a mine in eastern Wyoming were all high in kaolinite, having an average of 50% with 30% illite and 10% interstratified smectite-vermiculite.

54917 **Incidence of heavy metals in street surface sediments: solubility and grain size studies.** Ellis, J.B.; Revitt, D.M. (Middlesex Polytechnic, London). *Water, Air, and Soil Pollution;* **17**: No. 1, 87-100(Jan 1982).

Samples of surface and gutter sediment from roads within N.W. London have been analyzed for levels of Cd, Cu, Fe, Mn, Pb, and Zn. Sediment and associated metal grading curves are presented and apart from Mn and Fe which reflect natural background levels, the remaining metals show distributions which relate to road type and traffic conditions. For highways carrying the highest traffic densities the concentrations of Cd and Pb are greatest for grain sizes between 100 and 500 μm and an aggregation process is postulated. Residential side street samples show a marked affinity of Cd, Fe, and Zn for the coarsest grain fractions. Laboratory sorption and desorption studies are described and solution concentrations are obtained for Cd, Cu, Mn, Pb, and Zn over 1 to 30 day time periods. Solubility curves are typically variable with time. The relationship of leachate patterns to particle size and sample site location is discussed and its relative importance to stormwater loadings is considered. Extraction efficiencies for the five metals are found to be independent of road type and in the order Cd > Zn, Cu > Mn >

Pb. The relevance of this hierarchy to stormwater toxicity is discussed.

54018 **Optically active biological particle-distinguishing apparatus.** Salzman, G.C.; Kupperman, R.H. US Patent Application 6-452,360. [nd]. 9p. Contract W-7405-ENG-36.

The disclosure is directed to organic particle sorting and identification. High frequency pulses of circularly polarized light, alternating between left and right, intersect a fast moving stream of organic particles. Circular intensity differential scattering and linear intensity differential scattering are monitored to uniquely identify a variety of organic particles.

5103 Radioactive Materials Monitoring And Transport

REFER ALSO TO CITATION(S) 53365, 53603, 53643, 53649, 53678, 54349, 54898, 54906, 54907, 54997, 55036

54019 **(ARL/TR—049) Environmental radiation at the Monte Bello Islands from nuclear weapons tests conducted in 1952 and 1956.** Moroney, J.R.; Cooper, M.B. (Australian Radiation Lab., Melbourne). Dec 1982. 60p. NTIS (US Sales Only), PC A04/MF A01. Order Number DE83703432.

The results from the 1962 and 1968 surveys of environmental radiation at the Monte Bello Islands are presented. These were the first of the series of surveys of radioactive contamination of the Islands to be carried out following nuclear weapons tests conducted in 1952 and 1956. Detailed comparison is made with the results obtained in the subsequent surveys in 1972 and 1978. For more than 20 years, no area at the Monte Bello Islands has presented an acute hazard due to external exposure to environmental radiation.

54020 (ARL/TR—050, pp 138) **Investigation of the speciation of radionuclides in sediments and soils.** Cooper, M.B.; Williams, G.A. Jan 1983. NTIS (US Sales Only), PC A08/MF A01.

In Annual review of research projects 1981.

54021 (ARL/TR—050, pp 139) **Natural radioactivity in the production of titanium dioxide pigment: a study of the Laporte plant and environmental behaviour of radionuclides at Bunbury, Western Australia.** Cooper, M.B.; Statham, J.R.; Williams, G.A. Jan 1983. NTIS (US Sales Only), PC A08/MF A01.

In Annual review of research projects 1981.

54022 (CONF-830101—, pp 391-397) **Improvement in radiation exposure measurements at Rocky Flats over the past 30 years and its possible impact on epidemiological studies.** Lagerquist, C.R.; Putzier, E.A. (Rockwell International, Golden, CO). 1983. NTIS, PC A24/MF A01.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

The precision of measuring radaition exposures has steadily improved since the Rocky Flats Plant became operational in 1952. These improvements raise questions for the epidemiologists who are trying to relate possible radiation-induced effects to total radiation exposure. The effect of these changes on total dose is discussed. The practice of estimating systemic depositions of plutonium 3 to 5 times higher than the amounts found at autopsy is also discussed in the context of possible effects on epidemiological studies.

54023 **(GSF-K—90) Radioecology.** Feldt, W. (Gesellschaft fuer Strahlen- und Umweltforschung m.b.H. Muenchen, Neuherberg (Germany, F.R.). Inst. fuer Strahlenschutz). Jul 1982. 90p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83751047.

In this review, the basic concepts necessary for a complete understanding of ecology and radioecology are initially outlined. This is followed by an insight into the natural radiation doses of individual components of an ecosystem. The behaviour of radionuclides in terrestrial and aquatic food chains is described and followed, finally, by the presentation of a number of radioecological models.

54024 **(Juel-Spez—161) Background radioactivity in the monazite areas of Kerala, India.** Soman, S.D. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Zentralabteilung fuer Chemische Analyse). Jul 1982. 26p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83751052.

External radiation exposure measurements were carried out with natural CaF_2 thermoluminescence dosimeters (TLD) in about 2500 dwellings and on about 10.000 persons living in monazite areas of south-west coast of India. Statistical analysis of the data indicate that the values are distributed lognormally. A systematic study was carried out a Manavalakurichi plant of Indian Rare Earths Ltd. and adjoining high background areas to obtain typical average radiation exposure to different categories of workers from both occupation and non-occupation. Results of thoron measurements from the exhaled breath of plant workers are presented from which the body burden of natural thorium deposited in lungs can be estimated. An important pathway of exposure, for which children are most susceptible, is non-specific ingestion of raw sand itself. Data obtained on the radonuclide content of urinary excretion of children belonging to two age groups are discussed.

54025 **(KFKI—1982-114) Intercomparison of some environmental monitoring methods applied at nuclear power plants in Czechoslovakia (Bohunice) and in Hungary (Paks).** Andrasi, A.; Nemeth, I.; Zombori, P. (Hungarian Academy of Sciences, Budapest. Central Research Inst. for Physics). Jan 1983. 16p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703443.

Details are given of an intercomparison of some environmental monitoring methods applied at nuclear power plants in Czechoslovakia (Bohunice) and in Hungary (Paks). Soil and grass samples were analysed by gamma-spectrometry, flame photometry and by chemical methods after proper sample preparation by the participating institutes. In situ dose rate measurements were also performed at the sampling locations. The results show that the measuring methods used give reliable and comparable data for the routine environmental monitoring of nuclear power plants.

54026 **(NUREG/CR—3404) Predictive geochemical modeling of interactions between uranium-mill-tailings solutions and sediments in a flow-through system: model formulations and preliminary results.** Peterson, S.R.; Felmy, A.R.; Serne, R.J.; Gee, G.W. (Pacific Northwest Lab., Richland, WA (USA)). Aug 1983. Contract AC06-76RL01830. 93p. (PNL—4782). NTIS, PC A05/MF A01 - GPO $5.00. Order Number DE83017847.

Portions are illegible in microfiche products.

An equilibrium thermodynamic conceptual model consisting of minerals and solid phases was developed to represent a soil column. A computer program was used as a tool to solve the system of mathematical equations imposed by the conceptual chemical model. The combined conceptual model and computer program were used to predict aqueous phase compositions of effluent solutions from permeability cells packed with geologic materials and percolated with uranium mill tailings solutions. Initial calculations of ion speciation and mineral solubility and our understanding of the chemical processes occurring in the modeled system were used to select solid phases for inclusion in the conceptual model. The modeling predictions were compared to the analytically determined column effluent concentrations. Hypotheses were formed, based on modeling predictions and laboratory evaluations, as to the probable mechanisms controlling the migration of selected contaminants. An assemblage of minerals and other solid phases could be used to predict the concentrations of several of the macro constituents (e.g., Ca, SO_4, Al, Fe, and Mn) but could not be used to predict trace element concentrations. These modeling conclusions are applicable to situations where uranium mill tailings solutions of low pH and high total dissolved solids encounter either clay liners or natural geologic materials that contain inherent acid neutralizing capacities. 116 references, 22 figures, 6 tables.

54927 (PINSTECH/HP—28) Levels of strontium 90 in the environment at PINSTECH (Period 1979-1980). Perveen, N.; Aziz, A. (Pakistan Inst. of Nuclear Science and Technology, Islamabad. Health Physics Div.). 1981. 16p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702975.

Strontium 90, a most toxic among the beta emitting radionuclides, is found in the environment originating mostly from the global fallout from nuclear tests. Radioactive concentration of this radionuclide was measured in air-borne particulates, precipitation, surface water, seasonal vegetables and other items of diet. The report describes a radiochemical procedure for the separation of Y 90 by solvent extraction leading to the determination of Sr 90 content in the environmental and biological samples. The report also presents data on the concentration of Sr 90 in the biomedia at PINSTECH during 1979-80. The values of these concentrations are fairly comparable to those published in the current literature.

54928 Comparative behavior of ^{99}Tc, ^{129}I, ^{127}I and ^{137}Cs in the environment adjacent to a fuels reprocessing facility. Garland, T.R.; Cataldo, D.A.; McFadden, K.M.; Schreckhise, R.G.; Wildung, R.E. (Pacific Northwest Lab., Richland, WA). *Health Physics;* **44**: No. 6, 658-662(Jun 1983).

Technetium-99 (^{99}Tc) and iodine-129 (^{129}I), long-lived fission products, are present in the environment principally as a result of nuclear weapons testing and fuels reprocessing. Elevated levels of ^{129}I have been demonstrated in the vicinity of fuels reprocessing facilities, whereas ^{99}Tc has been shown to be elevated near uranium enrichment facilities. While ^{129}I and ^{131}I have been measured at environmental levels and their distribution characterized, there have been few measurements of ^{99}Tc in the environment and its behavior and fate is presently unclear. In the present study, the distribution of ^{99}Tc, ^{129}I, ^{127}I and ^{137}Cs was measured in the surface soil profile and vegetation in the vicinity of a nuclear fuels reprocessing facility located on the Hanford Reservation in Washington State.

54929 The relative importance of uptake and surface adherence in determining the radionuclide contents of subterranean crops. Corey, J.C.; Boni, A.L.; Watts, J.R.; Adriano, D.C.; McLeod, K.W.; Pinder, J.E. III. (Savannah River Lab., Aiken, SC). *Health Physics;* **44**: No. 1, 19-28(Jan 1983). Contract AC09-76SR00001;AC09-76SR00819.

The adherence of Pu-bearing tarticles to external surfaces of carrots, turnips, red potatoes, and sweet potatoes accounted for ≧ 93% of their total Pu content. Uptake, which was measured as Pu content in peeled crops, accounted for ≦ 7%. Plutonium concentrations in most peeled crops were below background, and consequently, uptake could not be conclusively demonstrated.However, uptake accounted for most of the ^{137}Cs, ^{40}K, and ^{226}Ra contents of subterranean crops. Concentration ratios for total radionuclide contents (i.e. surface adherence plus uptake) ranged from 3.9×10^{1} for ^{40}K, to 1.1×10^{-3} for /sup 239,240/Pu. Approximately 1.5×10^{-3} pCi /sup 239,240/Pu adhered per cm^{3} of subterranean crop surface per 1 pCi Pu/g of soil.

54930 Iodine-129 in mule deer thyroids in the Rocky Mountain west. Markham, O.D. (Dept. of Energy, Idaho Falls, ID); Hakonson, T.E.; Whicker, F.W.; Morton, J.S. *Health Physics;* **45**: No. 1, 31-37(1983).

Thyroids from mule deer (Odocoileus hemionus) were collected in New Mexico, Colorado, Wyoming and Idaho and ^{129}I/^{127}I atom ratios were determined. Iodine-129/127 atom ratios were significnatly ($P < 0.005$) different among states. Ratios in Wyoming and Idaho control thyroids were significantly ($P < 0.05$) larger than ratios in New Mexico and Colorado. Fallout from past atmospheric nuclear tests at the Nevada Test Site is suggested as a possible explanation for the differences in ratios. Average ^{129}I/^{127}I ratios in thyroids of other large mammals collected 54 km west and 116 km northeast of the Idaho National Engineering Laboratory (INEL) in south eastern Idaho were up to 15 times those found in control thyroid samples from Idaho. Atmospheric effluents from the Idaho Chemical Processing Plant located on the INEL were likely responsible for the increase ratios in animals collected in the INEL vicinity. Although of no health consequence to the animals, ^{129}I in deer thyroids may be a sensitivie indicator of contaminants from nuclear fuel reprocessing plants and atmospheric nuclear tests or accidents.

54931 Plutonium contents and fluxes in a soybean crop ecosystem near a nuclear fuel chemical separations facility. Adriano, D.C. (Savannah River Ecology Lab., Aiken, SC); Pinder, J.E. III; McLeod, K.W.; Corey, J.C.; Boni, A.L. *Journal of Environmental Quality;* **11**: No. 3, 506-511(Jul 1982). Contract AC09-76SR00819.

A soybean (Glycine max) crop was grown in fields within 1 km of a nuclear fuel chemical separations plant at the Savannah River Plant, S.C. Aerial releases of ^{239}Pu and /sup 239,240/Pu have been occurring at various rates during the past 25 years and have produced characteristic Pu isotopic ratios (ISR) in various environmental matrices. This unique situation, along with pot studies and a farm site receiving only global fallout, provided the opportunity to study various biological and physical processes that determine Pu contamination of ecosystems and their components. Contamination of the external surfaces of the soybeans contributed more to Pu contamination than did root uptake and translocation. Contaminaton of beans harvested with a combine was also mostly surficial, indicating that physical processes are more important than biological processes in this "real-world" situation. Pu-bearing particles directly deposited from the point source (62-m stack) and soil-surface resuspendible materials were the primary contaminants for the vegetation, while resuspension and transfer of Pu-bearing particles from vegetative surfaces were the dominant ones for the harvested beans. The Pu input from this particular chemical separations facility to the foodstuff (soybean beans) contributed little to radiation dose to humans compared with the natural background radiation.

54932 Radionuclide concentrations in vegetation at a solid radioactive waste-disposal area in southeastern Idaho. Arthur, W.J. III. (Idaho National Engineering Lab., Idaho Falls). *Journal of Environmental Quality;* **11**: No. 3, 394-399(Jul 1982).

Concentrations of ^{238}Pu, /sup 239,240/Pu, and ^{241}Am in crested wheatgrass (Agropyron cristatum (L.) Gaertn) and Russian thistle (Salsola kali L.) samples collected at a solid radioactive waste-disposal area in southeastern Idaho were significantly ($P \leq 0.05$) greater than concentrations in control vegetation. No significant differences were found for ^{90}Sr or ^{137}Cs concentrations between the waste-disposal and control-area vegetation. Russian thistle had more radionuclide contamination than crested wheatgrass, presumably because of its greater rooting depth and spreading growth. The total radionuclide inventory of ^{90}Sr, ^{137}Cs, ^{239}Pu, / sup 239,240/Pu, and ^{241}Am in vegetation at the 36-ha waste-disposal area (77 μCi) was not significantly ($P > 0.05$) greater than the 17 μCi in control-area vegetation. Ninety percent of the radioactivity in waste-disposal area vegetation and 99% in control-area vegetation were attributed to ^{90}Sr and ^{137}Cs. The Pu inventory in Subsurface Disposal Area (SDA) vegetation was only 0.02% of the quantity of Pu estimated to occur in SDA surface soils in 1974. Accumulation of radionuclides by vegetation is not considered a major mode of radionuclide transport through the environment surrounding this radioactive-waste-disposal area.

5105 Site Resource And Use Studies

REFER ALSO TO CITATION(S) 53611, 53644, 53658, 53674, 53680, 53689

5106 Regulations

REFER ALSO TO CITATION(S) 54910

52 ENVIRONMENTAL SCIENCES, AQUATIC

5201 Basic Studies

REFER ALSO TO CITATION(S) 55083

54933 **(DOE/EV/70009—T2) Bathymetry of Alaskan arctic lakes: a key to resource inventory with remote-sensing methods.** Mellor, J.C. (Alaska Univ., Fairbanks (USA). Inst. of Marine Science). May 1982. Contract AT06-76EV70009. 366p. NTIS, PC A16/MF A01. Order Number DE83017777.

Portions are illegible in microfiche products; Thesis.

Water depth is a major factor in predicting resources associated with tens-of-thousands of uninventoried Alaskan arctic lakes. Lakes were studied for physical, chemical, and biological resources related to water depth in 3 specific areas along a north/south transect extending from Pt. Barrow on the Arctic Ocean to the foothills of the Brooks Range. Side-Looking Airborne Radar (SLAR) imagery was acquired over the same study transect to investigate its application for determining lake depth. Ice thicknesses, necessary for the interpretation of depth contours from SLAR imagery, were measured along with other parameters in the study lakes throughout the winter 1978-1979. This ice-thickness data and sequential SLAR images are used to illustrate a method of contouring water depths in arctic lakes. A computer program was developed to manipulate Landsat satellite digital data and compile a master file of lakes and their computer-calculated surface features (i.e. area, perimeter, crenulation, and centroid). 130 references, 68 figures, 17 tables.

54934 (NIRS-RSD—50, pp 22-23) **Strontium-90 and cesium-137 in marine sediment; April, 1978 to March, 1979. Radioactivity survey related with environmental and dietary materials.** Sep 1979. NTIS (US Sales Only), PC A03/MF A01.

In Radioactivity survey data in Japan.

The samples of rain and dry fallout, air-borne dust, service water and fresh water, soil, sea water, sea sediment, total diet, rice, milk, vegetables, tea, fish, shellfishes and seaweed, and fresh water fishes, their sampling and prior treatment are described. The methods of separating Sr-90 and Cs-137 and their measurement are explained. The estimations of stable Sr, K and Ca are made by atomic absorption spectroscopy, flame spectrophotometry and potassium permanganate titration, respectively. The general plan of radioactivity survey in Japan is shown. As the environmental data, the results of Sr-90 and Cs-137 in sea sediment obtained from April, 1978, to March, 1979, and the locations of sampling are given. In a table, the months and the locations of sampling, depth (m), and the amounts of Sr-90 and Cs-137 (pCi/kg) are shown. The maximum values are 17 pCi/kg of Sr-90 found in Mutsu Bay and 180 pCi/kg of Cs-137 in Ajisu, Yamaguchi Prefecture, in August, 1978.

54935 (NIRS-RSD—50, pp 16-19) **Strontium-90 and cesium-137 in service water; April, 1978 to September, 1978. Radioactivity survey related with environmental and dietary materials.** Sep 1979. NTIS (US Sales Only), PC A03/MF A01.

In Radioactivity survey data in Japan.

The samples of rain and dry fallout, air-borne dust, service water and fresh water, soil, sea water, sea sediment, total diet, rice, milk, vegetables, tea, fish, shellfishes and seaweed, and fresh water fishes, their sampling and prior treatment are described. The methods of separating Sr-90 and Cs-137 and their measurement are explained. The estimations of stable Sr, K and Ca are made by atomic absorption spectroscopy, flame spectrophotometry and potassium permanganate titration, respectively. The general plan of radioactivity survey in Japan is shown. As the environmental data, the results of Sr-90 and Cs-137 in source water and tap water obtained from April to September, 1978, and the locations of sampling are given. In a table, the months and the locations of sampling, pH, and the amounts of Sr-90 and Cs-137 (pCi/l) are shown. The maximum values in source water are 0.32 pCi/l of Sr-90 found in Kyoto in August, 1978, and 0.03 pCi/l of Cs-137 in Fukuoka in June, 1978. Those in tap water are 0.41 pCi/l of Sr-90 found in Wakkanai in June, 1978, and 0.06 pCi/l of Cs-137 in Matsuyama in July, 1978.

54936 (NIRS-RSD—50, pp 20-21) **Strontium-90 and cesium-137 in sea water; April, 1978 to March, 1979. Radioactivity survey related with environmental and dietary materials.** Sep 1979. NTIS (US Sales Only), PC A03/MF A01.

In Radioactivity survey data in Japan.

The samples of rain and dry fallout, air-borne dust, service water and fresh water, soil, sea water, sea sediment, total diet, rice, milk, vegetables, tea, fish, shellfishes and seaweed, and fresh water fishes, their sampling and prior treatment are described. The methods of separating Sr-90 and Cs-137 and their measurement are explained. The estimations of stable Sr, K and Ca are made by atomic absorption spectroscopy, flame spectrophotometry and potassium permanganate titration, respectively. The general plan of radioactivity survey in Japan is shown. As the environmental data, the results of Sr-90 and Cs-137 in sea water obtained from April, 1978, to March, 1979, and the locations of sampling are given. In a table, the months and the locations of sampling, Cl (%), sample volume analyzed (l), and the amounts of Sr-90 and Cs-137 (pCi/l) are shown. The maximum values are 0.21 pCi/l of Sr-90 found in Osaka Bay in August, 1978, and 0.19 pCi/l of Cs-137 off Niigata Port in July, 1978.

54937 **The analytical pyrolysis of particulate residues of decomposing Myriophyllum heterophyllum.** Boon, J.J. (F.O.M. Inst. for Atomic and Molecular Physics, Amsterdam, The Netherlands); Windig, W.; Welzel, R.G.; Godshalk, G.L. *Aquatic Botany;* **15**: No. 3, 307-320(Mar 1983). Contract AC02-76EV01599.

Mature tissue and particulate organic decomposition products of the submersed aquatic plant Myriophyllum heterophyllum Michx were analysed by Curie-point pyrolysis low voltage ionisation mass spectrometry. Decomposition was performed under controlled aerobic and anaerobic conditions at 10°C and 25°C for 180 days. Particulate components were analysed at 0, 2, 4, 10, 48, 90 and 180-day intervals. The composition of the native plant material changed markedly during the decomposition period, as was demonstrated qualitatively and quantitatively by factor analysis of the pyrolysis mass spectrometric data. The particulate residues were characterized by increasing amounts of proteins and N-acetyl aminosugars, especially at the longer decomposition intervals. Decreasing weight loss correlated with an increasing presence of these polymers in or on the decomposing plant structural matter. This process took place faster at the higher decomposition temperatures. The anaerobic processes were more sensitive to temperature than the aerobic processes.

54938 **Adaptive explicit-implicit quasi three-dimensional finite element model of flow and subsidence in multiaquifer systems.** Newman, S.P. (Univ. of Arizona, Tucson); Preller, C.; Narasimhan, T.N. *Water Resources Research;* **18**: No. 5, 1551-1561(Oct 1982).

A quasi three-dimensional finite element model is presented for the analysis of groundwater flow and land subsidence due to pumpage in multiaquifer systems. In the model, aquifers are simulated with the aid of two-dimensional horizontal finite element grids. Each aquifer is connected to its neighbors above and below by one-dimensional vertical finite element strings which allow leakage to take place across aquitards and aquicludes. Land subsidence is modeled by varying the void ratio of each vertical element according to a nonlinear version of Terzaghi's one-dimensional consolidation theory. A major feature of the new method is its ability to solve the finite element equations explicitly in one part of the mesh and implicitly in another part, depending on the ratio between the stability limit of each node and any given time step size. Since the hydraulic diffusivity of aquitards is usually very small compared to that of aquifers, it is often possible to solve the finite element equations explicitly for most, and sometimes all aquitard nodes. This leads to a virtual decoupling of the aquifer equations during a given time step, which results in a significant saving of computer time and storage.

5202 Chemicals Monitoring And Transport

REFER ALSO TO CITATION(S) 53437, 53438, 53441, 53442, 53462, 54299, 54349, 54888, 54911

54939 (AD-A—128080/9) Annotated bibliography on the biological effects of constructing channels, jetties, and other coastal structures. Miscellaneous report. Ford, J.C.; Hurme, A.K.; Pullen, E.J. (Coastal Engineering Research Center, Fort Belvoir, VA (USA)). Jan 1983. 67p. NTIS, PC A04/MF A01.

This bibliography includes 199 historic and recently published research reports for use in evaluating the biological effects of constructing channels, jetties, and other coastal structures on fish and shellfish migration.

54940 (AD-P—000792/2) Treatment of phenol with an innovative fluidized bed activated carbon anaerobic filter. Cheng, S.S.; Chian, E.S.K. (Georgia Inst. of Tech., Atlanta (USA). School of Civil Engineering). 1982. 19p. NTIS, PC A02/MF A01.

Test results demonstrated the effectiveness of the two-stage anaerobic filters in the treatment of phenolic wastewaters. Results indicated that the anaerobic process employed in this study can be used for the treatment of phenol -bearing wastewater. Whereas the maximum concentration of phenol that can be treated with the anaerobic process is still under evaluation, the optimum concentration of phenol was found to be 1600 mg/l. This is 4 times higher than that reported in the literature. A maximum loading of 2 Kg phenol/cu m 3 day (i.e., 4.76 Kg COD/cu m 3 day) was accomplished with a 94 percent conversion of both COD and TOC. At the maximum loading studied (2 Kg phenol/cu m 3 day) a 99.7 percent conversion of phenol was obtained with the reactors connected in reverse order, i.e., fluidized carbon column followed by fixed Raschig ring bed. By reversing the sequence of reactor order, i.e., fluidized column followed by fixed bed, it resulted in an effluent having low suspended solids concentrations.

54941 (DOE/EV/70009—T1) Pipeline haul-road investigations north of the Brooks Range. Alexander, V.; Miller, M.C. (Alaska Univ., Fairbanks (USA). Inst. of Marine Science). May 1982. Contract AT06-76EV70009. 105p. NTIS, PC A06/MF A01. Order Number DE83017804.

Portions are illegible in microfiche products.

The haul road operated by Alyeska during and after the construction of the Alaska Pipeline from Prudhoe Bay to Valdez was investigated for ecological effects on ponds, lakes, and wetlands along its route across the North Slope of the Brooks Range. The dust generated by wind and passing trucks was deposited on vegetation and water surfaces as a double log function of distance away from the road. The dust leached Ca^{++} and nutrients which had the potential to modify pond productivity and vegetation structure. The leachates contained nitrogen and phosphorus, which was stimulatory to phytoplankton in these ponds. However, a six-year study of several ponds failed to detect any change caused by dustfall alone. The most acute increases were caused by contact with fresh pad material and its leachates or by direct fertilization to enhance the reestablishment of vegetation. Thus, stimulation of production usually occurred only during 1 to 2 years. The sediments in both the ponds and lakes along the transect apparently immobilized the additional phosphorus by binding to Fe^{+++} compounds in the water and surface sediments. Zooplankton population density closely followed primary production except at very high zooplankton densities which apparently overgrazed the algae. The species in old ponds followed the predictions of the fish and Heterocope predation model of O'Brien. The species in new ponds were largely colonizers. 52 references.

54942 (PB—83-193284) Remedial actions at hazardous waste sites: survey and case studies. Final report. Neely, N.; Gillespie, D.; Schauf, F.; Walsh, J. (SCS Engineers, Inc., Covington, KY (USA)). Jan 1981. 243p. NTIS, PC A11/MF A01.

With the passage of Superfund legislation providing for the clean-up of environmental hazards at uncontrolled waste disposal sites, information is needed on types of remedial actions that have been implemented to date, as well as their effectiveness and cost. This report provides this information by presenting the results of the nationwide survey of 169 such remedial action sites. More specific information on nine of these sites is provided in the form of detailed case studies, also contained in this material.

54943 (PB—83-196477) Hydrocarbon spills, their retention in the subsurface and propagation into shallow aquifers. Pfannkuch, H.O. (Minnesota Univ., St. Paul (USA). Water Resources Research Center). Apr 1983. 55p. NTIS, PC A04/MF A01.

The two most important phases in the propagation of a hydrocarbon spill into the subsurface occur in the vadose or unsaturated zone, between the land surface and the water table, and in the groundwater flow zone at its contact with the free oil phase. The last determines the dissolution and spreading of contaminants through the most mobile flow zone. The first determines the spill geometry, the amount of free phase oil that reaches the groundwater body and the total retention of spilled oil. Oil retention studies carried out for this project show whether the volume of soil within a spill site is sufficient to retain the oil without it escaping into the groundwater, and also gives a rough approximation of how long it takes for the oil phase to reach pendular saturation.

54944 (PB—83-209056) Review and evaluation of oil spill models for application to North Carolina waters. Final report. Muga, B.J. (North Carolina Coastal Energy Impact Program, Raleigh (USA)). Aug 1982. 118p. NTIS, PC A06/MF A01.

A review of the general status of oil spill modeling is presented. The major processes of importance to oil spill motion are advection, spreading, dispersion and evaporation. The relative importance of each of the processes is depicted on a time-length diagram. This diagram is also employed to indicate those processes that are most important to the various North Carolina waters. Some recommendations regarding prediction of oil slick behavior in North Carolina waters are presented in the report.

54945 Trace metals in tropical river environment--distribution. Paul, A.C. (Indian Rare Earths Ltd., Derala State, India); Pillai, K.C. *Water, Air, and Soil Pollution;* **19**: 63-73(1983).

Distribution of trace metals in the Periyar river has been investigated in detail. The fluvial concentrations of trace metals increase in river water and decrease in sediments during the summer months due to solubilization and concentration by evaporation. The levels, especially of Zn and Cd which are industrial pollutants increase by a factor of 10 both in water and sediments at the industrial zone. The concentration of Cd in the river water approaches the WHO standards for safe limits in drinking water. Solubilization at the backwater zone under high salinity is identified as one of the major mechanisms of trace metal transport to the marine environment. River meandering is responsible for large scale deposition of suspended solids at the industrial zone during the monsoon period. The trace metals exhibit build-up in specific concentration in the suspended solids in proportion to their residence time.

54946 Trace metals in tropical river environment--speciation and biological transfer. Paul, A.C. (Indian Rare Earths Ltd., Derala State, India); Pillai, K.C. *Water, Air, and Soil Pollution;* **19**: 75-86(1983).

Speciation of trace metals in the river water indicates possible organic bonding. Copper is highly complexed with the humic matter in the river sediments. Trace metals show higher levels in the milk of the cows fed on a contaminated pasture. Analysis of fish from the river shows highest enhancement in concentration for Cd. Tissuewise, the concentrations are highest in bone and liver. Calculation of the projected daily intake of trace metals, from consumer items produced locally, shows the intake of Zn and Cd to be high.

54947 Polychlorinated biphenyls in the sediments of the Inner Oslofjord. Abdullah, M.I. (Univ. of Oslo, Norway); Ringstad, O.; Kveseth, N.J. *Water, Air, and Soil Pollution;* **18**: No. 4, 485-497(Nov 1982).

Sediment cores (16) from the Inner Oslofjord were analyzed for PCB's and DDT. Although localized high content of PCB's is observed, the data show even distribution of these compounds - a consequence of removal by particulate and detrital matter and the sedimentation of this material. Significant modification of the profiles of PCB's in the sedimentary column together with fractionation of the PCB's according to their chlorine content are observed. The extent of these changes is shown to be related to the physicochemical conditions in the sediments and hence the extent of biological mediation.

54948 **Process for removal of ammonia and acid gases from contaminated waters.** King, C.J.; Mackenzie, P.D. US Patent Application 6-414,544. 3 Sep 1982. 24p. Contract W-7405-ENG-48.

Contaminating basic gases, i.e., ammonia and acid gases, e.g., carbon dioxide, are removed from process waters or waste waters in a combined extraction and stripping process. Ammonia in the form of ammonium ion is extracted by an immiscible organic phase comprising a liquid cation exchange component, especially an organic phosphoric acid derivative, and preferably di-2-ethyl hexyl phosphoric acid, dissolved in an alkyl hydrocarbon, aryl hydrocarbon, higher alcohol, oxygenated hydrocarbon, halogenated hydrocarbon, and mixtures thereof. Concurrently, the acidic gaseous contaminants are stripped from the process or waste waters by stripping with stream, air, nitrogen, or the like. The liquid cation exchange component has the ammonia stripped therefrom by heating, and the component may be recycled to extract additional amounts of ammonia.

54949 **Bioaccumulation kinetics and organ distribution of nickel in the marine clam (Protothaca staminea).** Hardy, J.T.; Roesijadi, G. (Battelle Northwest Lab., Sequim, WA). *Bulletin of Environmental Contamination and Toxicology;* **28**: No. 5, 566-572(May 1982). Contract AC06-76RL01830.

Studies were undertaken to determine the degree of bioconcentration, kinetics of accumulation, and tissue distribution of Ni in marine clams exposed to seawater enriched with subtoxic levels of Ni. Nickel concentrations in the gills of whole clams were three times greater than those of excised gills exposed to the same concentration for 48 hr. Results show that both uptake and elimination rates of Ni were biphasic, with an initial rapid phase (probably surface adsorption and desorption) and a second slower phase responsible for net accumulation. Whole clams accumulated substantial quantities of Ni. However, much of this was associated with the shell and bioconcentration of Ni from seawater occurred to a much lesser degree than Cd, Cu, or Hg under similar conditions. (JMT)

5203 Radioactive Materials Monitoring And Transport

REFER ALSO TO CITATION(S) 53603, 53649, 53673, 53686, 54898, 54923, 54927, 54934, 54935, 54936

54950 (ARL/TR—050, pp 141) **Natural radioactivity in bottled mineral water.** Cooper, M.B.; Ralph, B.J.; Wilks, M.J. Jan 1983. NTIS (US Sales Only), PC A08/MF A01.

In Annual review of research projects 1981.

54951 **(DOE/ER—0161) Ecological Research Division Marine Research Program.** (USDOE Office of Energy Research, Washington, DC. Office of Health and Environmental Research). Aug 1983. 75p. NTIS, PC A04/MF A01. Order Number DE83017880.

The marine research program focuses on two major environmental issues facing development and expansion of most energy technologies: Waste Disposal and Siting/Operations. Studies are designed to provide answers concerning mobilization of contaminants, their migration, concentration, and fate as well as their effects on the marine environment, including pathways back to human populations. In addition, pressures for siting energy facilities in coastal areas continue to increase and competing demands on the environment must be balanced. Thus, an integrated, multidisciplinary program is being conducted which combines research on transport and fate of contaminants with studies on water mass movements and ecosystem structure and function.

54952 **(DOE/EV/12529—22) Plutonium, cesium, uranium, and thorium series radionuclides in the Hudson River estuary and other environments. Annual technical progress report, December 1, 1982-November 30, 1983.** Simpson, H.J.; Trier, R.M.; Anderson, R.F. (Columbia Univ., Palisades, NY (USA). Lamont-Doherty Geological Observatory). 1983. Contract AC02-76EV12529. 65p. (COO—2529-22). NTIS, PC A04/MF A01. Order Number DE83018094.

We have measured radionuclide activities in a large number of sediment cores and suspended particle samples throughout the salinity range of the Hudson River estuary. Activities of ^{137}Cs, ^{134}Cs and ^{60}Co determined by gamma spectrometry and $^{239,240}Pu$ and ^{238}Pu determined by alpha spectrometry indicate reasonably rapid accumulation rates in the sediments of marginal cove areas, and very rapid deposition in the harbor region adjacent to New York City, resulting in $^{239,240}Pu$ accumulations there more than an order of magnitude greater than the fallout delivery rate. Fallout $^{239,240}Pu$ moving downstream in the Hudson appears to be almost completely retained within the system by particle deposition, while more than 50% of the ^{137}Cs derived from both reactor releases and fallout has been exported from the tidal Hudson to coastal waters. Measurements of fallout $^{239,240}Pu$ in a saline lake with a high carbonate ion concentration yielded water column activities about two orders of magnitude greater than has been found for fallout plutonium in other continental waters, indicating extensive mobility in some natural water environments. Experiments using lake water suggest that carbonate ion is likely to be a critical factor in regulating plutonium solubility in some environments and that low molecular weight complexes are primarily responsible for enhanced plutonium solubility. 5 references.

54953 **(IAEA-R—2137/F) Th-230/Th-232 sedimentation rates and the natural radiation background along the western coast of Israel. Final report for the period 15 December 1977 - 31 October 1981.** Kronfeld, J. (International Atomic Energy Agency, Vienna (Austria)). Jan 1982. 19p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703434.

The natural radiation background of the sediments from the southeastern province of the Levant Basin was determined by both alpha-particle spectrometry and by gamma-ray spectrometry using a specially low background high resolution Ge(Li) detector. The Nile river derived clastics dominates the sediment character along the Israeli coast. The radioelements in nine cores under the Nile's influence are readily distinguishable, having higher potassium, uranium and thorium contents, from the more carbonate rich sediments investigated in three cores from the northwestern province of the Levant Basin. Significant fluctuations exist in the radiometal content with depth within individual cores. The rate of sediment transport and deposition are so rapid that no Th-230 excess accumulated in the sediment deposited relatively nearshore. In the deep water of the Herodotus Basin only a small degree of Th-230 excess is recorded. Determination of absolute rates of sedimentation by uranium series disequilibria is not feasible for the sediments near to the Israeli coast, while such studies in the Herodotus Basin would require long core lengths to succeed.

54954 **Plutonium and americium export to the north-east Pacific Ocean by Columbia River runoff.** Beasley, T.M.; Ball, L.A.; Blakesley, B.A. (Oregon State Univ., Newport). *Estuarine, Coastal and Shelf Science;* **13**: 659-669(1981).

Between July 1978 and July 1979, monthly samples of water collected near the mouth of the Columbia River were analyzed for Pu and Am to budget the annual quantity of these radionuclides exported to the adjacent coastal zone. During this period, approximately 70 mCi of $^{239,240}Pu$ and 17 mCi of ^{241}Am were carried by the river to the ocean. From the depositional history of a fine-grained sediment core raised from within the Columbia River estuary, an estimated 4-8 Ci of $^{239,240}Pu$ and 1-2 Ci of ^{241}Am have entered the north-east Pacific Ocean by river transport since the late 1950s. This input would have increased the transuranic inventories in adjacent coastal sediments by at most 2.5 times those expected as a result of direct atmospheric fallout.

5204 Thermal Effluents Monitoring And Transport

REFER ALSO TO CITATION(S) 53755

5205 Site Resource And Use Studies

REFER ALSO TO CITATION(S) 53440, 53689

54955 **(PB—83-207001) Animal-sediment relationships: a case study of the Patapsco River.** Reinharz, E. (Johns Hopkins Univ., Baltimore, MD (USA)). May 1983. 96p. NTIS, PC A05/MF A01.

Extension of toxicant-related research from the main stem of Chesapeake Bay into the estuarine tributaries is important for two reasons: (1) many of the industrial sites and domestic activities are situated along the banks of these riverine systems, and (2) these subestuaries may function as closed basins in terms of sedimentation, trapping sediment-borne toxicants. The objectives of this study are as follows: (a) describe benthic community patterns in the Patapsco River compared to a reference area, the Rhode River, (b) characterize bioturbation levels and sedimentary structures in the two areas, (c) define sediment deposition rates (via 137 Cesium and pollen) along both subestuaries, and (d) define the histopathological condition of the bivalve, Macoma balthica, throughout the estuarine systems. Sampling was limited to the mid-spring of 1981; a total of 18 sites was examined.

54956 **(PB—83-207670) Stability of relocated stream channels. Final report, January 1978-December 1980.** Brice, J.C. (Geological Survey, Menlo Park, CA (USA). Water Resources Div.). Mar 1981. 187p. NTIS, PC A09/MF A01.

Data gathered to document the stability of streams at 103 sites in different regions of the United States where stream channels were relocated for the purposes of highway construction indicate varied responses. In comparison with prior stream stability, bank erosion of the relocated channel was the same at 45 sites, better at 28 sites, and worse at 14 sites. Channel degradation, mostly minor, was discerned at 17 sites. Length of relocation contributed significantly to channel stability only at sites where its value exceeded 250 channel widths; below 100 channel widths, the effects were dominated by other factors. Among the factors identified as critical to the stability of relocated channels are: growth of vegetation on banks; bank revetment; and stability of prior channel.

54957 **(PB—83-209064) Beach communities and oil spills: environmental and economic consequences for Brunswick County, North Carolina. Summary report.** (North Carolina Coastal Energy Impact Program, Raleigh (USA)). Sep 1982. 57p. NTIS, PC A04/MF A01.

Coastal areas are vulnerable to environmental damage and economic loss from oil spills. This report describes the recreational resources and economic activities in the coastal area of Brunswick County, North Carolina, and discusses their vulnerabilities to oil spills. Detailed economic analyses are made of the commercial fishing industry, recreational fishing and boating, the vacation and retirement housing industry, and seasonal visitation. Surveys of coastal businesses provided much of the data and information contained in these analyses. Potential sources, risks, and types of economic impact of oil spills are identified and reviewed.

5206 Regulations

REFER ALSO TO CITATION(S) 54945

54958 **(PB—83-197921) Development document for effluent limitations guidelines and standards for the battery manufacturing point source category.** Belefski, M.L.; Hall, E.P. (Environmental Protection Agency, Washington, DC (USA). Effluent Guidelines Div.). Oct 1982. 1150p. (EPA—440/1-82/067-B). NTIS, PC A99/MF E06.

The document presents data rationale and technical aspects of the proposed effluent limitations and standards for the battery manufacturing industry published in the Federal Register on November 10, 1982 (47 FR 51052-218).

54959 **(PB—83-224394) Adapting appropriation water law to accommodate equitable consideration of instream flow uses.** Bagley, J.M.; Larson, D.T.; Kapaloski, L. (Utah State Univ., Logan (USA). Utah Water Research Lab.). Jun 1983. 124p. NTIS, PC A06/MF A01.

The increasing public interest in naturally flowing streams has fostered efforts to obtain their protection under existing state water laws. In this study, the water laws of Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming were examined and compared with eachother, and against a set of salient criteria, to assess shortcomings in accommodating instream flow protections. It was determined that the appropriations system has the essential features of and embodies legal principles that should allow the accommodation of instream flow values but, at this point in time, purchase of existing rights or the exercise of governmental reservation/withdrawal/appropriation authorities seem to be the primary options.

53 ENVIRONMENTAL-SOCIAL ASPECTS OF ENERGY TECHNOLOGIES

5301 Social And Economic Studies

REFER ALSO TO CITATION(S) 53397, 53398, 54060, 54957

5302 Assessment Of Energy Technologies

REFER ALSO TO CITATION(S) 53394, 53763

54960 **(PB—83-199190) Industrial process profiles for environmental use: Chapter 30. The electronic component manufacturing industry. Final report.** (PEDCo-Environmental, Inc., Cincinnati, OH (USA)). Apr 1983. 235p. NTIS, PC A11/MF A01.

This report is one of a series constituting the catalog of Industrial Process Profiles for Environmental Use. Each industry sector is addressed as a separate chapter of the study. The catalog was developed for the purpose of compiling relevant information concerning air, water, and solid waste emissions from industries which employ similar technologies, have common types of environmental impacts, and supply their products for further processing or consumption to the same general population of customers. This report addresses the following segments of the electronic component manufacturing industry: semiconductors, SIC 3674; capacitors, SIC 3675; resistors, SIC 3676; transformer and inductors, SIC 3677; printed circuit boards, SIC 3679052; electron tubes, SIC 36711, 36713; and cathode ray tubes, SIC 36712, 3671385.

5303 Environmental Impact Statements

54961 **(NUREG—0925-Final) Final environmental statement related to the operation of the Teton Uranium ISL Project (Docket No. 40-8781.** (Nuclear Regulatory Commission, Arlington, TX (USA). Region IV). Aug 1983. 271p. NTIS, PC A12/MF A01 - GPO $7.50. Order Number DE83902786.

Portions are illegible in microfiche products.

This Final Environmental Impact Statement is issued by the US Nuclear Regulatory Commission in response to the request by Teton Exploration Drilling, Inc. for the issuance of an NRC Source and Byproduct Material License authorizing operation of the proposed Teton Project to mine uranium in situ by injecting a carbonate/bicarbonate lixiviant into the ore body. The statement considers: (1) alternative of no licensing action, (2) alternative energy sources, and (3) alternatives if uranium ore is mined and refined on the site. The proposed action is to grant a Source and Byproduct Material License to the applicant subject to the stipulated license condition.

55 BIOMEDICAL SCIENCES, BASIC STUDIES

5502 Biochemistry

REFER ALSO TO CITATION(S) 54338, 54972, 54981

54962 **(CONF-8308110—1) Isolation of an active site peptide from spinach ribulose bisphosphate carboxylase/oxygenase modified by glyoxylate.** Cook, C.M.; Tolbert, N.E.; Hartman, F.C. (Union Carbide Corp., Oak Ridge, TN (USA). Nuclear Div.). 1983. Contract W-7405-ENG-26. 5p. NTIS, PC A02/MF A01. Order Number DE83017219.

From 6. international congress on photosynthesis; Brussels, Belgium (1 Aug 1983).

Gloxylate has been shown to be a slowly reversible inhibitor of CO_2/Mg^{2+}-activated ribulose-P_2 carboxylase/oxygenase. Reduction of the glyoxylate-enzyme complex with sodium borohydride resulted in a convalently modified adduct indicative of Schiff base formation between glyoxylate and the ϵ-NH_2 gorup of lysyl residues. Complete inactivation of the enzyme corresponded to the incorporation of 1 mol glyoxylate/mol protomer (L + S subunit). The formation of a covalently modified glyoxylate-enzyme complex has enabled the purification and sequencing of the glyoxylate-derivitized peptide and identification of the amino acid bearing the glyoxylate moiety.

54963 **(DOE/ER/10903—4) Phytochrome from green plants: assay, purification, and characterization.** Quail, P.H. (Wisconsin Univ., Madison (USA)). 1983. Contract AC02-81ER10903. 28p. NTIS, PC A03/MF A01. Order Number DE83017447.

Phytochrome from the chlorophyllous cells of light-grown higher plants and green algae has been isolated and characterized. We have developed a simple procedure that separates chlorophyll from phytochrome in crude extracts from green tissue thus permitting spectral measurement of the phytochrome in such extracts for the first time. Spectral and immunochemical analysis of phytochrome from green oat tissue indicates the presence of two distinct species of the molecule: a minority species (~ 20%) that is recognized by antibodies directed against phytochrome from etiolated tissue and that has an apparent molecular mass of 124 kilodaltons (kD), the same as that of the native molecule from etiolated tissue; and a majority species (~ 80%) that is not recognized by anti-etiolated tissue phytochrome Ig and has a Pr absorbance maximum some 14 nm shorter than its etiolated tissue counterpart. Mixing experiments have established that these different molecular species preexist in the green cell and are not the results of posthomogenization modifications. Attempts to purify the phytochrome from green tissue by immunoaffinity chromatography have been thwarted by the lack of immunological cross-reactivity referred to. We have begun to identify monoclonal antibodies specific for antigenic sites distributed throughout the length of the etiolated-tissue phytochrome polypeptide. Axenic cultures of the alga Mesotaenium have been established and preliminary spectral analysis of phytochrome isolated from these cells has been carried out.

54964 **Heavy water tracing of soil-water transfers under irrigation.** Moutonnet, P.; Couchat, P. (Atomic Energy Commission, Saint-Paul-Lez-Durance, France). *Soil Science Society of America Journal;* **46**: No. 2, 435-438(Mar 1982).

In soil columns, a horizon was labeled with heavy (deuterated) water (D_2O), and the evolution of D_2O during the experiment was monitored in situ by gamma-neutron counting. An automatic irrigation device was used for crop watering. Based on the results of two consecutive experiments (H_2O and D_2O balance and water transfer analysis), the system was found to provide fully satisfactory irrigation. Deuterated water labeling, moreover, proved to be an effective technique for evaluating root uptake in a soil horizon.

5503 Cytology

REFER ALSO TO CITATION(S) 54339, 54918, 55047

5504 Genetics

REFER ALSO TO CITATION(S) 53781, 55039

5505 Metabolism

54965 (ARL/TR—050, pp 91-94) **Studies of the calcium metabolism of subjects with renal dysfunction.** Kotler, L.H. Jan 1983. NTIS (US Sales Only), PC A08/MF A01.

In Annual review of research projects 1981.

In order to perform a detailed study of calcium metabolism, it is necessary to differentiate between intestinal absorption and its subsequent behaviour in terms of either uptake onto the bone or excretion. The measurement of calcium absorption involved two separate intakes of the tracer ^{47}Ca. Each subject ingested a known activity. Measurements on blood samples were made after 5 hours and a smoothed curve describing the appearance of the activity in the plasma was determined. About 4 weeks after oral ingestion a known activity was injected into the subject and the procedure repeated. A curve describing the differential transfer of calcium from the intestine to the blood stream was derived by performing a deconvolution procedure on the two curves.

54966 **(BNL—33554) Electron transfer around photosystem I in cyanobacterial heterocyst membranes.** Hawkesford, M.J.; Houchins, J.P.; Hind, G. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 4p. (CONF-8308110—2). NTIS, PC A02/MF A01. Order Number DE83017626.

From 6. international congress on photosynthesis; Brussels, Belgium (1 Aug 1983).

Cyanobacteria are unique among the prokaryotes in possessing a higher plant-type of photosynthesis, with two photosystems linked in series. The heterocyst is a specialized cell type occurring in some filamentous strains at a frequency of 5 to 10%, and is the site of N_2-fixation under aerobic conditions. During differentiation of the heterocyst, the O_2-evolving PSII is lost and cyclic electron transfer around PSI predominates. The absence of PSII reaction centres and the diminished levels of accessory pigments give membranes isolated from heterocysts excellent properties for spectroscopic studies. Soluble components such as plastocyanin, cytochrome c-553 and PSI acceptors, washed from the membranes during isolation, may be selectively reconstituted. Additionally, the presence of an endogenous uptake hydrogenase which can be utilized experimentally to reduce the plastoquinone pool and the electron transfer chain, make heterocyst membranes a useful system in which to study cyclic electron flow. This paper reports an initial flash spectroscopic characterization of the electron transfer chain and speculates on the potential of the system.

54967 **(BNL—33561) Effects of continuous-background irradiance on xenon-flash-induced fluorescence yields in marine microalgae.** Falkowski, P.G.; Wyman, K.; Mauzerall, D. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 5p. (CONF-8308110—3). NTIS, PC A02/MF A01. Order Number DE83017584.

From 6. international congress on photosynthesis; Brussels, Belgium (1 Aug 1983).

The well established inverse relationship between photosynthesis and fluorescence yield has been interpreted in the context of a model of photosynthesis in which fluorescence, photochemistry, and non-radiative decay all compete for excitation energy in the antenna chlorophyll of PS II traps by first-order rate processes. When all PS II traps are open, the yield of photochemistry is maximal while that of fluorescence is minimal (F_0); and when reaction centers are closed, the yield of photochemistry is minimal while fluorescence yields become maximal (F/sub M/). By measuring the fluorescence yields of saturating actinic flashes followed by weak probe flashes, we inferred both turnover times and cross-sections of PS II traps in a marine diatom with and without continuous back-

ground irradiance. Our results suggest that the delayed double-flash technique can be used to estimate photosynthetic electron flow under steady-state irradiance levels. 8 references.

54968 **(LBL—15180) Metabolic changes associated with shoot formation in tobacco callus cultures.** Grady, K.L. (Lawrence Berkeley Lab., CA (USA)). Aug 1982. Contract AC03-76SF00098. 243p. NTIS, PC A11/MF A01. Order Number DE83017678.

Thesis.

Callus tissue derived from Nicotiana tabacum L. stem pith parenchyma cells was grown either on medium which maintains the callus in an undifferentiated state, or on medium which induces the formation of shoots. Two complementary types of studies were performed with the goal of establishing metabolic markers for the initiation of shoot formation: one designed to characterize the flow of radioactive sucrose into various metabolic pools, and one which allowed measurement of intermediary metabolite concentrations. In the former, callus tissue was incubated in [U-^{14}C]sucrose for periods up to one hour, and patterns of metabolite labelling in tissue grown on shoot-forming and non-shoot-forming media were compared. In the latter studies, tissue was grown for an entire subculture period on non-shoot-forming medium labelled with [U-^{14}C]sucrose, then subcultured to labelled non-shoot-forming or shoot-forming media, and sampled at intervals during the first week of growth. 189 references.

54969 **Quantitative autoradiography with radiopharmaceuticals, Part 2: Applications in radiopharmaceutical research: concise communication.** Som, P.; Yonekura, Y.; Oster, Z.H.; Meyer, M.A.; Pelletteri, M.L.; Fowler, J.S.; MacGregor, R.R.; Russell, J.A.; Wolf, A.P.; Fand, I. . (Brookhaven National Laboratory, Upton, New York). *Journal of Nuclear Medicine;* **24**: No. 3, 238-244(Mar 1983).

We describe the application of macroautoradiography, a relatively simple, quantifiable method for the evaluation of positron-emitting and gamma-emitting radiopharmaceuticals. We have investigated the response properties of two types of film to positron (F-18) and negatron (C-14) emitters. Variations in the response of film to increasing film-to-source distance are described, along with the effects of different intensifying screens and mounting tape. Digitization of whole-body autoradiograms (WBARG) in small animals was performed by using a videodensitometry system (videocamera interfaced to a computer). Quantitation was derived from analysis of a series of step-wedge standards that covered the range of radioactivities in the sample. By using a close-up lens on the videocamera, a 2- by 2-cm field is digitized as a 128 X 128 array, each pixel representing 156 X 156 micron. The effect of chlorpromazine (CPZ) on glucose metabolism in mice was studied by giving C-14 2DG followed by CPZ and F-18 FDG in the same animal. Muscle activity decreased and brown-fat activity increased. The high spatial resolution of this technique enables quantification in structures as small as the basal ganglia in mice. The use of dual-nuclide ARG permits each animal to be its own control, which greatly increases the utility of this method.

5506 Medicine

REFER ALSO TO CITATION(S) 54347, 54348, 54752, 54965, 55012, 55047, 55055, 55056

54970 (ARL/TR—050, pp 44-48) **Kilovoltage calibration of medical x-ray generators.** Mika, J.F.; Martin, L.J.; Young, B. Jan 1983. NTIS (US Sales Only), PC A08/MF A01.

In Annual review of research projects 1981.

Measurement of the peak kilovoltage of an x-ray beam is discussed. The method involves monitoring the scattered or transmitted radiation when a sample is placed in the primary x-ray beam. The intensities are monitored over a range of tube kilovoltage around the K-edge energy of the sample. When either absorption or fluorescence is observed, it is known that the tube kilovoltage is greater than the K-edge energy for that scattering material. By using different elements, a series of calibration points can be obtained.

54971 **(CEA-CONF—6561) Proton nuclear scattering radiography.** Duchazeaubeneix, J.C.; Faivre, J.C.; Garreta, D. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). Oct 1982. 4p. (CONF-821011—52). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703566.

From IEEE nuclear science symposium; Washington, DC, USA (20 Oct 1982).

Nuclear scattering of protons allows to radiograph objects with specific properties: direct 3- dimensional radiography, different information as compared to X-ray technique, hydrogen radiography. Furthermore, it is a well adapted method to gating techniques allowing the radiography of fast periodic moving systems. Results obtained on different objects (light and heavy materials) are shown and discussed. The dose delivery is compatible with clinical use, but at the moment, the irradiation time is too long between 1 and 4 hours. Perspectives to make the radiography faster and to get a practical method are discussed.

54972 **(CONF-8306122—1) Measurements, in vivo, of parameters of the dopamine system.** Friedman, A.M.; DeJesus, O.T.; Dinerstein, R.; Revenaugh, J. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 30p. NTIS, PC A03/MF A01. Order Number DE83017964.

From National Institute of Health workshop; Bethesda, MD, USA (22 Jun 1983).

This paper discusses methods of measuring important parameters of the dopamine system in the living animal by use of PET techniques. One primary concern is the density and binding affinity of post-synaptic neuroreceptors. A second concern is the activity of neurons. In vivo, this is generally related to the turnover of neurotransmitter and can also be related to the uptake of precursor compounds by the neurons. If the transmitter and neuroleptic compound compete for the same binding sites (on the receptor molecule) these two effects are interwoven and are not easily isolated. It appears that the movement of neuroleptic drugs from the brain is slow enough to allow equilibrium to be maintained between ligand and receptor, especially after some time for the initial washout and translocation in the brain. To test the consequences of equilibrium binding and the possible use of the model for measurement of receptor densities by emission tomography we have modified Clark's equilibrium model of ligand binding. In this note we will describe the solutions of the equations and some comparisons of the predictions of the model with data, as well as its application to tomographic measurements.

54973 **(IAEA-R—2571-F) Development of the kits for RIA simultaneous determination of polypeptide hormones. Final report for the period 15 March 1980 - 14 December 1982.** Szybinski, Z. (International Atomic Energy Agency, Vienna (Austria)). Dec 1982. 50p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83703565.

A simple and universal modification of chloramine T technique has been developed for the radioactive iodination of several polypeptide hormones such as insulin, human growth hormone (HGH), human TSH, synthetic human gastrin and beta-endorphine. The prepared products proved to have good immunoreactivity suitable for RIA purposes. The technique is inexpensive and quick. A new procedure has also been worked out utilizing horse myeloperoxidase in solid state as catalyser. The hormones iodinated with this technique show better parameters (e.g. longer stability, better binding to antibody, more favourable adsorption on dextran-coated charcoal); however the specific activities achieved were lower. The possibilities of simultaneous measurement of insulin and HGH have been studied. In this connection, a comparatively simple method for the determination of the endogenous anti-insulin antibodies was developed and used for the control of patients with diabetes and for the checking of new insulin preparations. However, the technique requires relatively sophisticated equipment and computerized calculations.

54974 **(PB—83-228809) Computerized tomographic scanners, Veterans Administration.** (Veterans Administration, Washington, DC (USA)). 1980. 62p. NTIS, PC A04/MF A01.

Evidence is presented for the desirability and cost-effectiveness of acquiring computerized tomography (CT) facilities for selected VA tertiary care facilities. The rationale is that hospitals offering comprehensive multidisciplinary therapeutic services must also possess equally comprehensive diagnostic capabilities. The current status and clinical applications of CT are discussed, together with cost analysis, workload data, and relative costs of CT exams at participating VA hospitals having in-house capabilities. Criteria are presented for the acquisition and assignment of CT units, and costs are given for CT scans on a contract basis.

54975 **(PB—83-232157) Effects of added resistance to breathing in obstructed lung disease. Phase 1.** Petsonk, L.; Boyles, C.; Hodous, T.; Hankinson, J. (National Inst. for Occupational Safety and Health, Morgantown, WV (USA)). Dec 1981. 27p. NTIS, PC A03/MF A01.

Regulations of the Occupational Safety and Health Administration mandate that workers exposed to hazardous substances be provided with respiratory protective devices when engineering and administrative controls cannot adequately protect the worker. These regulations also provide that the workers who are unable to wear these devices for reasons of health be exempted from doing so. Although there is considerable experimental evidence in the literature concerning the effects of added resistance and deadspace on the breathing of normal individuals, there are few studies which address these effects in subjects with obstructive lung disease. Since most working populations include subjects with mild to moderate airways obstruction (due either to occupational or non-occupational causes) it is important to know if these individuals can safely tolerate respiratory protective devices. In order to address this problem, the authors examined the response to exercise with and without added resistance to breathing of subjects with obstructive lung disease and compared those responses to a group of normals. The results are discussed in this report and recommendations for further study are made.

54976 **(PB—83-234708) Image analysis of chest radiographs. Final report.** Hankinson, J.L. (National Inst. for Occupational Safety and Health, Cincinnati, OH (USA)). 1 Jun 1982. 67p. NTIS, PC A04/MF A01.

The report demonstrates the feasibility of using a computer for automated interpretation of chest radiographs for pneumoconiosis. The primary goal of this project was to continue testing and evaluating the prototype system with a larger set of films. After review of the final contract report and a review of the current literature, it was clear that several modifications to the prototype system were needed before the project could continue. These modifications can be divided into two general areas. The first area was in improving the stability of the system and compensating for the diversity of film quality which exists in films obtained in a surveillance program. Since the system was to be tested with a large number of films, it was impractical to be extremely selective of film quality. The second area is in terms of processing time. With a large set of films, total processing time becomes much more significant. An image display was added to the system so that the computer determined lung boundaries could be verified for each film. A film handling system was also added, enabling the system to scan films continuously without attendance.

54977 **Differential radioactivity monitor for non-invasive detection of ocular melanoma.** Lambrecht, R.M.; Packer, S. US Patent Application 6-422,511. 23 Sep 1982. 16p. Contract AC02-76CH00016.

There is described an apparatus and method for diagnosing ocular cancer that is both non-invasive and accurate which comprises two radiation detectors positioned before each of the patient's eyes which will measure the radiation level produced in each eye after the administration of a tumor-localizing radiopharmaceutical such as gallium-67.

54978 **(CEA-tr—3-257-6) Radiography system enabling clear images to be obtained with an X ray dose less than 1/10th of that employed in conventional radiography.** (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). Jan 1982. Translated from Nikkei Electronics, 58-60(17 Aug 1981) (Japan). 4p. (In French). CEN Saclay, Service de Documentation, 91191 - Gif-sur-Yvette Cedex (France).

A system of medical radiography has been developed which requires only a dose of X rays less than 1/10th of that used in conventional radiography to obtain images with a good resolution. Under this system, the radiograph on the X ray detection plate is temporarily memorized. By scanning this radiograph with a light ray, electric signals are obtained. After digital processing of the image, the resulting electric signals are used to prime a laser. The scanning of the film by the output light enables the image to be reconstituted. The core of the system is formed by the plate of inorganic crystals which memorizes the X ray radiograph transmitted by the human body. However, no information has been provided as yet on the material, structure and operating principle of this plate.

5507 Microbiology

REFER ALSO TO CITATION(S) 53741, 54328, 54918

54979 **(DOE/ER/10684—T1) Methanogenesis from acetate, a key intermediate in nature. Third year report.** (California Univ., Los Angeles (USA). School of Public Health). 1982. Contract AT03-80ER10684. 36p. NTIS, PC A03/MF A01. Order Number DE83016736.

Progress is reported in the following research areas: (1) isolation of genetic mutants of Methanosarcina, (2) the role of H_2 in the conversion of acetate (and methanol) to methane; and (3) isolation and characterization of methanogenic bacteria from nature. (ACR)

5508 Morphology

54980 **Longevity, life history, and relative body wall size in sea urchins.** Ebert, T.A. (San Diego State Univ., CA). *Ecological Monographs;* **52**: No. 4, 353-394(Dec 1982).

Annual survival rates in 38 populations of 17 sea urchin species in the Indo-West Pacific were related to relative size of the body wall and exposure to the surf. Populations were studied at Hawaii, Enewetak Atok, Queensland, New South Wales and Western Australia, Sri Lanka, Seychelles, Kenya, Zanzibar, and Isaerl (Eilat). Live animals were dissected to determine the size of body components. Parameters of the Richards growth function were determined from animals tagged with tetracycline. Tagged animals were collected after they had been in the field for 1 yr. Growth parameters were used with parameters from size-frequency distributions to estimate Z, the mortality coefficient. Stepwise multiple regression was used to examine the relationship between annual survival probability (p) and two indepencent variables, α and E, where E is a subjective measure of exposure to surf (1 = most exposed). Survivorship increases with increased relative size of the body wall and with increased protection from the surf. The positive relationship between survival probability and relative body wall size supports the hypothesis that survival is related to allocation of resources to maintenance. The significane of longevity in urchins probably is that it is related to the predictability of survival of prereproductive individuals. The greater the unpredictability, the longer life must be. Long life requires a greater investment in maintenance mechanisms and hence, among other adaptations, a more massive body wall.

5509 Pathology

REFER ALSO TO CITATION(S) 55055

5510 Physiological Systems

54981 (DOE/ER/70185—T1) Respiration of roots. Response to low O_2 stress. Final report. Beevers, H. (California Univ., Santa Cruz (USA). Dept. of Biology). 1983. Contract AT03-76ER70185. 3p. NTIS, PC A02/MF A01. Order Number DE83017433.

Progress is reported on the following research areas: (1) the germination and growth of rice seedlings in the absence of oxygen has been investigated. It was shown that this growth is not due to a higher tolerance for the accumulating ethanol than that shown by other seedlings; (2) the role of alcohol dehydrogenase in the ability of rice to withstand low oxygen was studied. An inactivator which rapidly attacks the enzyme when the cells are broken was found. The inactivator is associated with an organelle fraction sedimenting in sucrose gradients close to the endoplasmic reticulum. The action of the inactivator, which appears to be a protein, can be prevented by dithiothreitol. (ACR)

5520 Public Health

REFER ALSO TO CITATION(S) 55005

54982 (PNL-SA—11282) Note on homogeneity tests when combining 2 x 2 tables. Tolley, H.D.; Olsen, A.R. (Pacific Northwest Lab., Richland, WA (USA)). Sep 1983. Contract AC06-76RL01830. 23p. NTIS, PC A03/MF A01. Order Number DE83017871.

This paper examines the use of homogeneity tests prior to tests of overall association among g 2 x 2 tables. When placed in the context of a one-way analysis of variance, hypotheses of overall association and homogeneity can be viewed as hypotheses regarding mean and treatment effects, respectively. In this context, the need for homogeneity tests is presented. What constitutes a relevant test of homogeneity is also examined. The conclusion is that some of the difficulties raised in the literature regarding tests of homogeneity stem from the fact that the wrong hypothesis is being examined. 11 references.

5530 Agriculture And Food Technology

54983 (IAEA-TECDOC—269) Elemental composition of human and animal milk. A review. A report prepared under the auspices of the IAEA in collaboration with the WHO. Iyengar, G.V. (International Atomic Energy Agency, Vienna (Austria); World Health Organization, Geneva (Switzerland)). Sep 1982. 186p. NTIS (US Sales Only), PC A09/MF A01. Order Number DE83703562.

A review is presented of the elemental composition of human and animal milk with special reference to trace elements determined through nuclear techniques, particularly neutron activation analysis (NAA). In the joint IAEA/WHO research project, 16 of the 24 elements under investigation have been analysed by NAA with the aid of advanced research nuclear reactors. Literature data are discussed and tabulated in 50 separate tables (one for each element) mainly for the period after 1950. Each table uses a standard format comprising 10 columns indicating (1) source of milk (e.g. human or animal), (2) status of the milk (colostrum, transitional or mature), (3) country of origin, (4) year of data publication, (5) mean concentration, (6) range of single values or standard deviation of the mean, (7) number of samples analysed, (8) analytical technique employed, (9) literature source of the data, and (10) relevant remarks, if any. The most abundant data refer to the minor elements Ca, Cl, K, Mg, N, Na, P and S and to the trace elements Cu, Fe and Zn. Fewer data are available for Cd, Hg, I, Mn, Pb and Se. For the remaining elements, including such biologically important trace elements as As, Co, Cr, F, Mo, Ni, Si and Sn, very few reliable data so far appear to exist.

54984 (IAEA-TECDOC—270, pp 9-24) Woody plants and land use. Huxley, P.A. (International Council for Research in Agroforestry, Nairobi (Kenya)). Sep 1982. NTIS (US Sales Only), PC A06/MF A01. (CONF-8111163—).

From Meeting on the use of nuclear techniques in improving fertilizer and water management techniques for tree crops; Vienna, Austria (9 Nov 1981).

The importance of woody species in land use systems has recently gained international attention. In addition to the production of food and fuelwood, trees can maintain or improve the fertility status of the soil and conserve both soil and water. The use of multipurpose trees in land use system and the important role of trees in association with other crops is now recognized. The methods of scientifically studying such systems, and of manipulating them to improve their productivity or net utility have not been well developed. This introductory paper documents the role of woody species in agriculture, forestry and agroforestry. It outlines some of the important research needs for such systems and the role which isotopes could play in the research.

54985 (IAEA-TECDOC—270, pp 25-36) Olive and citrus tree crops and their fertilization in Greece: Field studies with ^{15}N labelled fertilizers. Papanicolaou, E.P. (Democritus Nuclear Research Center, Athens (Greece)). Sep 1982. NTIS (US Sales Only), PC A06/MF A01. (CONF-8111163—).

From Meeting on the use of nuclear techniques in improving fertilizer and water management techniques for tree crops; Vienna, Austria (9 Nov 1981).

Fertilizer use for tree crops in Greece is increasing rapidly, however, fertilizer experiments with olive and citrus tree crops have given results which were often inconclusive. The value of using isotopically labelled fertilizers to directly measure fertilizer uptake is thus obvious. A preliminary experiment determined that relatively low enriched ^{15}N fertilizers (1.0-1.5% atom excess) could be accurately detected in citrus trees. The concentration of added N was higher in the leaves than in the wood and fruit. In a second study foliarly applied ^{15}N urea was found to be taken up more efficiently than broadcast urea or ammonium sulphate. In an initial sampling distribution of N among the plant parts was similar to that of the initial study, although a final harvest and analysis must still be conducted.

54986 (IAEA-TECDOC—270, pp 61-68) Uptake of ^{15}N labelled urea and ammonium nitrate by 4-year old Douglas-fir grown in sand-peat mix. Pang, P.C.K. (Environment Canada, Pacific Forest Research Centre, Victoria, B.C.). Sep 1982. NTIS (US Sales Only), PC A06/MF A01. (CONF-8111163—).

From Meeting on the use of nuclear techniques in improving fertilizer and water management techniques for tree crops; Vienna, Austria (9 Nov 1981).

Four-year old Douglas-fir planted in a 1:1 ratio of sand and peat mixture were fertilized with 200 kg N/ha in the form of either $(^{15}NH_3)_2CO$, $^{15}NH_4NO_3$ or $NH_4{}^{15}NO_3$ and grown in a shadehouse over periods of one and two years. Under the experimental conditions, trees recovered a higher percentage of ^{15}N from the NO_3- than the NH_4+ source. The soil retained a higher percentage of N from NH_4+ than the NO_3- source. % Ndff suggested NO_3- is the preferred N source for the Douglas-fir. A description is also given of some of the ongoing experiments related to N fertilization of forests underway at the Pacific Forest Research Centre.

54987 (IAEA-TECDOC—270, pp 83-93) Use of isotopes for the study of Hevea and other tree crops. Samaraweera, M.K.S.A. (Rubber Research Inst., Agalawatte (Sri Lanka)). Sep 1982. NTIS (US Sales Only), PC A06/MF A01. (CONF-8111163—).

From Meeting on the use of nuclear techniques in improving fertilizer and water management techniques for tree crops; Vienna, Austria (9 Nov 1981).

Research in developing countries using isotopes to study rubber trees is presented. Radioisotopes have been used to determine rooting patterns and to develop fertilizer recommendations for the trees. The efficiency of fertilizer use by trees can be improved by research to explain the nutrient-soil-tree interactions. Isotopes

can also play a role in studying plant growth substances and their effect on nutrition and on physiological disorders. Other worthwhile studies related to the biochemistry, chemistry and physiology of rubber and latex production in Sri Lanka are discussed.

54988 (IAEA-TECDOC—270, pp 95-97) **Fertilizer use efficiency.** Papanicolaou, E.; Bole, J.B. Sep 1982. NTIS (US Sales Only), PC A06/MF A01. (CONF-8111163—).

From Meeting on the use of nuclear techniques in improving fertilizer and water management techniques for tree crops; Vienna, Austria (9 Nov 1981).

54989 (IAEA-TECDOC—270, pp 103-104) **Applications of neutron moisture depth probes in tree research.** Leyton, L.; Mitrosuhardjo, M.M. Sep 1982. NTIS (US Sales Only), PC A06/MF A01. (CONF-8111163—).

From Meeting on the use of nuclear techniques in improving fertilizer and water management techniques for tree crops; Vienna, Austria (9 Nov 1981).

54990 (IAEA-TECDOC—270, pp 105-106) **Nitrogen fixation by tree crops.** Hardarson, G.; Danso, S.K.A. Sep 1982. NTIS (US Sales Only), PC A06/MF A01. (CONF-8111163—).

From Meeting on the use of nuclear techniques in improving fertilizer and water management techniques for tree crops; Vienna, Austria (9 Nov 1981).

54991 (IAEA-TECDOC—270, pp 107-108) **Nitrogen fixation by cover crops.** Pang, P.C.K.; Danso, S.K.A. Sep 1982. NTIS (US Sales Only), PC A06/MF A01. (CONF-8111163—).

From Meeting on the use of nuclear techniques in improving fertilizer and water management techniques for tree crops; Vienna, Austria (9 Nov 1981).

54992 (IAEA-TECDOC—270, pp 109) **Plant physiological isotope aided studies specific to rubber trees.** Ladonin, V.; Samaraweera, M.K.S.A. Sep 1982. NTIS (US Sales Only), PC A06/MF A01. (CONF-8111163—).

From Meeting on the use of nuclear techniques in improving fertilizer and water management techniques for tree crops; Vienna, Austria (9 Nov 1981).

54993 (IAEA-TECDOC—270, pp 37-60) **Studies using ^{32}P to determine the distribution and activity patterns of the oil palm root system in Nigeria.** Omoti, U. (Nigerian Inst. for Oil Palm Research, Benin City). Sep 1982. NTIS (US Sales Only), PC A06/MF A01. (CONF-8111163—).

From Meeting on the use of nuclear techniques in improving fertilizer and water management techniques for tree crops; Vienna, Austria (9 Nov 1981).

Results of studies of the root distribution and root activity which have been conducted by the Nigerian Institute for Oil Palm Research over the last twenty-three years are presented. Previous laborious studies involving washing the soil from the entire root system have shown that the oil palm root system is typically monocotyledonous with superficial and deeply penetrating primaries, ascending and descending secondaries with numerous tertiaries and quaternaries in the surface layers forming the main feeding roots. Radioisotope studies showed that the greatest concentration and activity of the nutrient absorbing roots occurred within the top 30 cm of soil. There were zones of root concentration and root activity close to the palm. High root activity was also obtained up to 4 m from the palm. During the dry season, the oil palm roots die back thus leading to a reduced zone of root activity. The implications of the findings for fertilizer placement for maximum efficiency of utilization by the whole plantation and the need for further experimentation are discussed.

54994 (IAEA-TECDOC—270, pp 69-71) **Use of isotopes in the study of plant water relations.** Leyton, L. (Oxford Univ. (UK)). Sep 1982. NTIS (US Sales Only), PC A06/MF A01. (CONF-8111163—).

From Meeting on the use of nuclear techniques in improving fertilizer and water management techniques for tree crops; Vienna, Austria (9 Nov 1981).

Isotope techniques using tritiated water (THO) and ^{32}P have been used to directly measure transpiration by trees. Although ^{32}P injected into the transpiration stream was easier to measure than THO, and was less subject to diffusion, it underestimated the transpiration flux by 7-8%. Measurement of water transport with THO and DHO (deuterated water) showed that during drought periods water can be transferred from one part of the root system to another. However, the amount transferred was not enough to influence nutrient absorption by roots. Leaf and plant diffusion conductance could also be measured with THO in a closed chamber and by the use of a portable automatic diffusion porometer.

54995 (IAEA-TECDOC—270, pp 73-82) **Water relations of mycorrhiza.** Leyton, L. (Oxford Univ. (UK)). Sep 1982. NTIS (US Sales Only), PC A06/MF A01. (CONF-8111163—).

From Meeting on the use of nuclear techniques in improving fertilizer and water management techniques for tree crops; Vienna, Austria (9 Nov 1981).

The wettability of the surface of ectotrophic beech mycorrhiza roots which did not have any radiating hyphae, was much less than a non-mycorrhizal root epidermis. The mycorrhizal sheath has a lower permeability to the flow of water than the uninfected root. The mycorrhizal roots absorbed water more rapidly than non-mycorrhizal roots. Possible explanations for this unusual phenomenon were (1) the development of a lower water potential in water stressed mycorrhizal roots, (2) accummulation of absorbed water in the sheath and (3) a higher permeability of the sheath to incoming than outgoing water. A study with endotrophic red clover plants confirmed that infection markedly increased growth and P uptake. This was accompanied by a reduction in the root/shoot ratio. This could be explained by a faster recovery of stressed mycorrhizal plants when water was restored because they were more efficient in taking up water. Experiments with tritiated water (THO) were initiated but consistent values for conductivity were not obtained.

54996 (IAEA-TECDOC—270, pp 99-101) **Root activity.** Omoti, U.; Huxley, P.A. Sep 1982. NTIS (US Sales Only), PC A06/MF A01. (CONF-8111163—).

From Meeting on the use of nuclear techniques in improving fertilizer and water management techniques for tree crops; Vienna, Austria (9 Nov 1981).

54997 **Agrochemicals: fate in food and the environment. Proceedings of an international symposium on agrochemicals: fate in food and the environment using isotope techniques, jointly organized by the IAEA and the FAO and held in Rome, 7-11 June 1982.** Vienna; IAEA (1982). vp. (In French). (IAEA-SM—263/17; CONF-8206196—).

From International symposium on agrochemicals: fate in food and the environment using isotope techniques; Rome, Italy (7 Jun 1982).

Selected papers are indexed separately.

56 BIOMEDICAL SCIENCES, APPLIED STUDIES

5601 Radiation Effects

REFER ALSO TO CITATION(S) 53486, 53489, 53490, 53491, 53498, 53511, 53523, 53553, 53553, 53580, 53673, 53677, 53690, 53691, 53692, 53693, 53698, 53698, 53700, 53701, 53702, 53703, 53704, 54922, 54924, 54929, 54965, 55215

54998 **(ARL/TR—047) Dose contribution due to photonuclear reactions during radiotherapy.** Allen, P.D.; Chaudhri, M.A. (Australian Radiation Lab., Melbourne). Jul 1982. 9p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703439.

The dose equivalent due to photonuclear reactions within a patient irradiated with 24 MeV bremsstrahlung has been calculated

to be about 1% of the photon dose. This is more than 2 times smaller than the previously accepted estimate.

54999 **(ARL/TR—048) Evaluation of the radiation doses to uranium mine employees exposed to external gamma radiation.** Young, J.G.; Wilson, O.J. (Australian Radiation Lab., Melbourne). Feb 1983. 28p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83703440.

Factors to convert a personal monitor badge reading to an effective dose equivalent are given for several exposure geometries encountered in uranium mines. Factors are also given that relate a free air absorbed dose measurement to an effective dose equivalent. In addition, factors are reported which can be used to estimate the dose equivalent to the testes, ovaries and active bone marrow.

55000 (ARL/TR—050, pp 3) **Tissue to air ratios for open-cut uranium mine employees: a simulation using circular plane sources.** Wilson, O.J.; Young, J.G. Jan 1983. NTIS (US Sales Only), PC A08/MF A01.

In Annual review of research projects 1981.

55001 (ARL/TR—050, pp 39-40) **Dose due to photonuclear reactions in tissue during radiotherapy with high energy gamma rays.** Allen, P.D.; Chaudri, M.A. Jan 1983. NTIS (US Sales Only), PC A08/MF A01.

In Annual review of research projects 1981.

When a patient is irradiated with bremsstrahlung of energy greater than about 10 MeV, high LET particles are produced through photonuclear reactions in the tissue and contribute an additional dose to the patient. The absorbed dose contribution due to secondary neutrons is estimated to be 2.2×10^{-4}, 3.8×10^{-4}, 5.2×10^{-4} and 6.2×10^{-4} Gy per photon Gy at 24, 26, 28 and 30 MeV respectively. Based on an absorbed dose of 2.2×10^{-4} Gy per photon Gy due to photoneutrons, the absorbed dose due to photoprotons to 6.5×10^{-4} Gy per photon Gy, and that due to photoalpha particles is 0.7×10^{-4} Gy per photon Gy.

55002 **(ARL/TR—051) Examination of the distribution of patient doses from diagnostic x-ray procedures.** Morris, N.D. (Australian Radiation Lab., Melbourne). Feb 1983. 37p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83703441.

An examination was made of the distribution of patient doses from diagnostic radiology. The data were derived from an Australia wide survey carried out during the 1970's. There was a large range of doses to which patients were exposed. If establishments can reduce doses to below the most common value, the total dose to the population will be reduced to less than 60% of the present value.

55003 **(CONF-830101—) Epidemiology applied to health physics.** (Inhalation Toxicology Research Inst., Albuquerque, NM (USA); Sandia National Labs., Albuquerque, NM (USA); Los Alamos National Lab., NM (USA); USDOE, Washington, DC). 1983. Contract AC04-76DP00789;W-7405-ENG-36. 557p. NTIS, PC A24/MF A01. Order Number DE83014383.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The technical program of the mid-year meeting of the Health Physics Society, entitled Epidemiology Applied to Health physics, was developed to meet three objectives: (1) give health physicists a deeper understanding of the basics of epidemiological methods and their use in developing standards, regulations, and criteria and in risk assessment; (2) present current reports on recently completed or on-going epidemiology studies; and (3) encourage greater interaction between the health physics and epidemiology disciplines. Included are studies relating methods in epidemiology to radiation protection standards, risk assessment from exposure to bone-seekers, from occupational exposures in mines, mills and nuclear facilities, and from radioactivity in building materials. (JMT)

55004 (CONF-830101—, pp 5-31) **Radiation risks and benefits: politics and morality.** Maxey, M.N. (Univ. of Texas, Austin). 1983. NTIS, PC A24/MF A01.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

The bioethical framework from which moral reasoning concerning nuclear technology has been derived is both seriously flawed and conceptually inadequate. The reasons are examined and are arranged in response to three questions. First, what is the status of alleged scientific evidence from which moral conclusions about the unacceptability of man-made radiation exposures are derived. Secondly, what criticisms of risk assessment reasoning are pertinent to ethical reflection. Finally, what revisions in an ethical framework are necessary if risk estimates of low-dose radiation exposure are to be conducted properly.

55005 (CONF-830101—, pp 32-41) **Epidemiological methods: a brief review.** Winkelstein, W. Jr. (Univ. of California, Berkeley). 1983. NTIS, PC A24/MF A01.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

Epidemiology, the study of disease distributions in populations and the factors which influence these distributions, is an observational science, i.e., its data base consists of measurements made on free living individuals characterized by presence or absence of disease states and putative risk factors. Epidemiological studies are usually classified as descriptive or analytical. Descriptive studies are primarily used for planning and evaluating health programs or to generate etiological hypotheses. Analytical studies are primarily used for testing etiological hypotheses. Analytical studies are designed either as cohort investigations in which populations with and without a putative risk factor are followed through time to ascertain their differential incidence of disease, or case-control investigations in which the history of exposure to a putative risk factor is compared among persons with a disease and appropriate controls free of disease. Both descriptive and analytical epidemiological studies have been applied to health physics problems. Examples of such problems and the epidemiological methods used to explore them will be presented.

55006 (CONF-830101—, pp 42-66) **Methodologic assessment of radiation epidemiology studies.** Beebe, G.W. (National Cancer Inst., Bethesda, MD). 1983. NTIS, PC A24/MF A01.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

Epidemiologic studies of the late effects of ionizing radiation have utilized the entire spectrum of situations in which man has been exposed. These studies have provided insights into the dependence of human effects upon not only dose to target tissues but also other dimensions of exposure, host characteristics, and time following exposure. Over the past three decades studies have progressed from the mere identification of effects to their measurement. Because investigators of human effects have no control over the exposure situation, validity must be sought in the consistency of findings among independent studies and with accepted biologic principles. Because exposure may be confounded with factors that are hidden from view, bias may enter into any study of human exposure. Avoidance of bias and attainment of sufficient power to detect relationships that are real are methodologic challenges. Many methodologic issues, e.g., those associated with the definition and measurement of specific end-points, or with the selection of appropriate controls, permeate epidemiologic work in all fields. Others, especially those concerned with the measurement of exposure, the patterning of events in time after exposure, and the prediction of events beyond the scope of existing observations give radiation epidemiology its distinctive character.

55007 (CONF-830101—, pp 67-89) **Some statistical considerations related to the estimation of cancer risk following exposure to ionizing radiation.** Land, C.E. (National Cancer Inst., Bethesda, MD); Pierce, D.A. 1983. NTIS, PC A24/MF A01.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

Statistical theory and methodology provide the logical structure for scientific inference about the cancer risk associated with exposure to ionizing radiation. Although much is known about radiation carcinogenesis, the risk associated with low-level exposures is

difficult to assess because it is too small to measure directly. Estimation must therefore depend upon mathematical models which relate observed risks at high exposure levels to risks at lower exposure levels. Extrapolated risk estimates obtained using such models are heavily dependent upon assumptions about the shape of the dose-response relationship, the temporal distribution of risk following exposure, and variation of risk according to variables such as age at exposure, sex, and underlying population cancer rates. Expanded statistical models, which make explicit certain assumed relationships between different data sets, can be used to strengthen inferences by incorporating relevant information from diverse sources. They also allow the uncertainties inherent in information from related data sets to be expressed in estimates which partially depend upon that information. To the extent that informed opinion is based upon a valid assessment of scientific data, the larger context of decision theory, which includes statistical theory, provides a logical framework for the incorporation into public policy decisions of the informational content of expert opinion.

55008 (CONF-830101—, pp 90-104) **Mortality among workers at the Oak Ridge National Laboratory.** Checkoway, H. (Univ. of North Carolina, Chapel Hill); Mathew, R.M.; Wolf, S.H.; Shy, C.M.; Muller, S.M.; Beck, J.; Watson, J.E. Jr.; Wray, M.; Fry, S.A. 1983. NTIS, PC A24/MF A01. Contract AC05-76OR00033.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

A retrospective cohort mortality study was conducted among employees of the Oak Ridge National Laboratory. Since 1943, this facility has been the site of energy-related research, including uranium and plutonium recovery and radioisotope production. Historical follow-up conducted for the years 1943 to 1977 for 8681 white males who had been employed for at least one month during the period 1943 to 1972. Vital status was ascertained for 90 percent of the cohort. Standardized Mortality Ratios (SMRs) were computed to contrast the workers' mortality experience with that of the US white male population. The observed number of 1017 deaths from all causes was 74 percent of that expected, a finding indicative of the healthy worker effect and the relatively high socioeconomic status of the cohort. The SMR for all cancers was 0.75 (195 observed vs. 261.3 expected). Mortality deficits were seen for non-malignant diseases of all major organ groups and for all site-specific malignancies except prostate cancer (SMR = 1.13), leukemia (SMR = 1.16) and Hodgkin's disease (SMR = 1.28). None of the elevations was statistically significant. There were no consistent trends of cause-specific mortality with either external or internal radiation exposure levels.

55009 (CONF-830101—, pp 105-114) **DOE health and mortality study at Oak Ridge.** Lushbaugh, C.C. (Oak Ridge Associated Univs., TN); Fry, S.A.; Shy, C.M.; Frome, E.L. 1983. NTIS, PC A24/MF A01. Contract AC05-76OR00033.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

Epidemiologic studies are being conducted of persons (~ 600,000) employed by the Department of Energy (DOE) and its contractors since 1943 at ~ 80 facilities to determine whether health and mortality are affected by exposure to radiation, uranium, and other metals involved in development of nuclear materials. Historic cohort and nested case-control designs are used to identify excess mortality using the US population for comparison to determine whether certain jobs or environments are associated with increased risk of cancer mortality; and to identify any hazards involved. Procedures include routinized data collection and management and hazards assessment. Routine biostatistical methods have been extended to enable analyses to be made comparing mortality rates among more comparable populations than the US population at large. Such a comparative study has been completed of the mortality mortality experience of ~ 72,000 white male workers employed since 1943 at all four AEC/DOE facilities at Oak Ridge, TN. Results show that: age-specific death rates determined by Poisson-rate analysis follow the Gompertz-Makeham law. Mortality experience was different for each plant or facility and birth year subcohorts. Smoothed estimates of age-specific death rates from the Gompertz-Makeham model for five plant worker populations are presented and compared with US white male vital statistics.

55010 (CONF-830101—, pp 115) **Cancer mortality at a naval nuclear shipyard.** Rinsky, R.A. (National Inst. for Occupational Safety and Health Centers for Disease Control, Cincinnati, OH); Zumwalde, R.D.; Waxweiler, R.J.; Murray, W.E. Jr.; Bierbaum, P.J.; Landrigan, P.J.; Terpilak, M.; Cox, C. 1983. NTIS, PC A24/MF A01.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

To evaluate a reported five-fold increase in leukemia mortality among workers exposed to ionizing radiation at Portsmouth (New Hampshire) Naval Shipyard (PNS), a retrospective cohort mortality study of all PNS civilian workers employed from 1952 to 1977 was done. Three subcohorts were identified: 7615 workers with radiation exposure of 0.001 to 91.414 rem (mean 2.779 rem, median 0.545), 15,585 nonradiation workers, and 1345 workers selected for radiation work who received no measureable exposures. Vital status on 96% of the workers was ascertained and observed cause-specific mortality was compared with that expected from mortality-rates for United States white males. Leukemia mortality in radiation and nonradiation workers at PNS was also compared. There was no excess due to leukemia or any other cause. The Standardized mortality ratio for leukemia among radiation workers was 84 (95% confidence interval, 34 to 194). There was no dose-response relation with radiation or any increased mortality in radiation over nonradiation workers. The study was, however, limited by short latency (time since first mediation); only 53% of the workers had more than 15 years' latency.

55011 (CONF-830101—, pp 116-124) **Thyroid cancer from occupational exposures to iodine-131.** Shore, R.E. (New York Univ. Medical Center, NY). 1983. NTIS, PC A24/MF A01.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

Studies of external irradiation, primarily of children, suggest that the thyroid gland is one of the most radiosensitive sites for carcinogenesis. However, it has generally been thought that ^{131}I confers much less risk (per rad) than external radiation because of its low dose-rate. A review of the epidemiologic literature indicates that age at irradiation is also an important variable in defining thyroid cancer risk, with a lesser risk at older ages. The available human studies are reasonably consistent in affirming that risks following ^{131}I are small. However, the data on ^{131}I exposure are too sparse, particularly for childhood exposure, to determine how much of the observed diminution in risk is due to older ages at exposure and how much is attributable to the characteristics of ^{131}I exposure per se, such as low dose-rate. Since most of the existing studies have inadequacies in design, dose levels, dosimetry or number of subjects, additional studies are needed before the risk assessment of ^{131}I at lower dose levels in adult workers can be regarded as definitive.

55012 (CONF-830101—, pp 125-142) **Skin dose and response for the head and neck in patients irradiated with x-ray for tinea capitis: implications for environmental radioactivity.** Harley, N.H.; Kolber, A.B.; Shore, R.E.; Albert, R.E.; Altman, S.M.; Pasternack, B.S. (New York Univ. Medical Center, NY). 1983. NTIS, PC A24/MF A01. Contract AC02-76ER03077.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

The dose delivered to the skin of the head and neck in patients treated with x-ray irradiation for childhood tinea capitis was reconstructed. This was possible by utilizing a phantom made from the skull of a seven year old child and irradiating it with the same technique and x-ray machine used in tinea capitis therapy two to four decades ago. Seventy-eight basal cell carcinomas (BCC) have appeared so far in 40 of 1727 irradiated white children and none in 500 irradiated black children. The dose distribution over the face and scalp is used to estimate the risk of BCC per person per rad. These results must be considered preliminary due to the relatively young age of the irradiated group (<50 years) at the present time. From the decreased risk per rad for the portion of the scalp that is hair covered, it appears that environmental ultraviolet radiation may play a key role in the expression of BCC. A cumulative hazard plot is utilized to tentatively extend the data to lifetime risk of 0.003

per rad with an upper limit of 0.006 per rad. Environmental radiation dose to the skin possibly account for 20% of observed BCC if this tentative risk estimate is valid.

55013 (CONF-830101—, pp 143-152) **Theoretical epidemiology applied to health physics: estimation of the risk of radiation-induced breast cancer.** Sutherland, J.V. (Univ. of Colorado, Denver). 1983. NTIS, PC A24/MF A01.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

Indirect estimation of low-dose radiation hazards is possible using the multihit model of carcinogenesis. This model is based on cancer incidence data collected over many decades on tens of millions of people. Available data on human radiation effects can be introduced into the modeling process without the requirement that these data precisely define the model to be used. This reduction in the information demanded from the limited data on human radiation effects allows a more rational approach to estimation of low-dose radiation hazards and helps to focus attention on research directed towards understanding the process of carcinogenesis, rather than on repeating human or animal experiments that cannot provide sufficient data to resolve the low-dose estimation problem. Assessment of the risk of radiation-induced breast cancer provides an excellent example of the utility of multihit modeling procedures.

55014 (CONF-830101—, pp 153-158) **Historical background and overview of epidemiological studies on the effects of low-level radiation.** Upton, A.C. (New York Univ., NY). 1983. NTIS, PC A24/MF A01.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

Recognition of the carcinogenic effects of ionizing radiation dates from the early part of this century, when an increased frequency of skin cancer and leukemia was first reported in radiologists. In the interim, systematic epidemiological studies have disclosed additional carcinogenic effects in radiation workers, A-bomb survivors, patients exposed to diagnostic or therapeutic radiation, and other groups. The studies have provided sufficient data on dose-incidence relationships, the distribution of cancer in relation to age at irradiation and time after exposure, and organ-variations in susceptibility to enable attempts at quantitative assessment of the risks of low-level irradiation. Such assessments, although tentative and controversial, have exerted an important influence on developments in radiological protection.

55015 (CONF-830101—, pp 159-166) **Epidemiological studies of German patients injected with Ra-224.** Mays, C.W. (Univ. of Utah, Salt Lake City); Spiess, H. 1983. NTIS, PC A24/MF A01. Contract AC02-76EV00119.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

The health of 898 patients who received repeated injections of short-lived ^{224}Ra after World War II, mainly for the treatment of tuberculosis and ankylosing spondylitis has been followed. As of 1980, 53 of these patients had developed bone sarcoma vs only 0.2 cases expected naturally. Two patients with bone sarcoma subsequently developed an additional bone sarcoma. No new bone sarcomas have been reported since the end of 1974. For the patients in each category, the tumor rate at every year after ^{224}Ra injection was calculated by dividing the yearly number of bone sarcomas by the number of patients whose follow-up extended to that year. This corrected for the effects of death and incomplete follow-up. The yearly tumor rates were then summed to obtain the cumulative tumor rate. Dividing by the average skeletal dose in rads yielded the cumulative risk. The cumulative tumor risk was about 200 bone sarcomas/10^6 person rad of average skeletal dose and, with the dosimetric assumptions used, was not statistically different for (a) juveniles vs adults, (b) males vs females, or (c) TB patients vs spondylitic patients.

55016 (CONF-830101—, pp 167-180) **Follow-up studies on A-bomb survivors: implications for radiological protection.** Jablon, S. (National Academy of Sciences, Washington, DC). 1983. NTIS, PC A24/MF A01.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

A-bomb survivor data are the principal basis for risk estimates for late somatic and genetic effects of radiation on man. The data concern radiation delivered at high dose rate and the risk estimates are dominated by persons with doses (kerma) of more than 100 rads. The estimates, therefore, may not be applicable to low doses received at low dose rates, where some advocate use of a dose-rate reduction factor of at least two for carcinogenesis. In contrast with dose-rate factors, little attention has been given to individual factors such as age. Even after more than 35 years, the experience of only the oldest A-bomb survivors (aged over 50 in 1945) is essentially complete. It appears, however, that the risk of carcinogenesis may depend upon age at exposure and that relative risk may be a more appropriate measure than absolute risk. Limits for occupational or population exposures were not developed on the basis of risk estimates; such estimates can, however, be used to calculate the possible consequences of exposure standards. In contrast to carcinogenesis, which has been shown clearly in the data on A-bomb survivors, and despite the appearance of chromosome aberrations, no evidence of radiation-induced mutations in the children of survivors has yet been detected.

55017 (CONF-830101—, pp 181-198) **Utilization of epidemiological data in the development of radiation protection recommendations.** Sinclair, W.K. (National Council on Radiation Protection and Measurements, Bethesda, MD). 1983. NTIS, PC A24/MF A01.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

Risk estimates are based on epidemiological data and are subject to many uncertainties including the current uncertainty in the dosimetry of the Japanese survivors. However, risk estimates from other sources, excluding the Japanese data, do not lead to greatly different values. Furthermore, risk estimates made over more than a decade by various scientific bodies have differed little. Presumably these estimates represent a good basis for the quantitation of human experience following exposure to ionizing radiation. In considering risk in relation to protection levels the committed risk due to a single or continuous exposure varies in time and accumulates over the entire period of risk. Radiation risks are compared with other occupational and public hazards. The risks associated with current occupational, public and emergency levels and levels for use in space are discussed in relation to other hazards. Current average exposure levels for occupational circumstances do not seem unreasonable but radon exposures for some members of the public may constitute a more important source of exposure.

55018 (CONF-830101—, pp 199-207) **Considerations in using radiation dosimetry data in epidemiologic studies.** Hudson, D.H. (Oak Ridge Associated Univs. TN); Beck, W.L.; Fry, S.A.; Lushbaugh, C.C.; Watson, J. 1983. NTIS, PC A24/MF A01. Contract AC05-76OR00033.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

From experience to date, it is concluded that cohorts can be divided into useable risk groups without need for extensive calculations of individual doses. Several possible risk group classification schemes are presented for use with standard methods of data analysis. The rationale, advantages, and disadvantages of each are discussed with respect to possible classification biases, and statistical and practical considerations. Data from a cohort of nuclear material workers are used to illustrate these dichotomous and ordinal schemes.

55019 (CONF-830101—, pp 208-220) **New NRC methodology for estimating biological risks from exposure to ionizing radiation.** Willis, C.A; Branagan, E.F. (Nuclear Regulatory Commission, Washington, DC). 1983. NTIS, PC A24/MF A01.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

In licensing commercial nuclear power reactors, in the US Nuclear Regulatory Commission considers the potential health effects from the release of radioactive effluents. This entails reliance on epidemiological study results and interpretations. The BEIR III report is a principal source of information but as newer information becomes available, it is desirable to include this in NRC models. To

facilitate both the estimation of potential health effects and the evaluation of epidemiological study results, the NRC has supported the development of a new computer code (SPAHR). This new code utilizes much more comprehensive demographic models than did the previously used codes (CAIRD and BIERMOD). SPAHR can accommodate variations in all the principal demographic statistics such as age distribution, age-specific computing risks, and sex ratio. Also SPAHR can project effects over a number of generations.

55020 (CONF-830101—, pp 221-230) **Standard procedures for pooling health physics data for epidemiologic studies.** Strom, D.J. (Univ. of North Carolina, Chapel Hill); Beck, W.L.; Stansbury, P.S.; Tankersley, W.G.; Watson, J.E. Jr. 1983. NTIS, PC A24/MF A01. Contract AC05-76OR00033.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

The objectives of the study are: (1) to determine the availability of dosimetry data and supporting documentation at multiple facilities; (2) to develop criteria and methods for optimally retrieving data; (3) to evaluate and document the quality and completeness of data and dosimetry programs; (4) to put dosimetry data (e.g., external, whole body counting, and bioassay data) from various facilities in a single format for epidemiologic analysis; and (5) to document all work for peer review. To achieve these objectives, a "Dosimetry Records and Radiation Hazards Questionnaire" was developed to send to the facilities under study. Responses to this questionnaire are used to develop data retrieval criteria and methods, and to retrieve data. Dose data are reformatted into Standard Intermediate Dosimetry Files for editing and characterization. Evaluations of dosimetry programs are performed concurrently. Results of these steps are brought together and analysis files created. Status of this work in the context of the Department of Energy 5-Rem Study is reported. The standard procedures are applicable to single- as well as multiple-facility studies.

55021 (CONF-830101—, pp 231-239) **Data requirements for meaningful long-term epidemiology study of the commercial nuclear power industry.** Kniazewycz, B.G.; McArthur, W.C. (KLM Engineering, Inc., Walnut Creek, CA). 1983. NTIS, PC A24/MF A01.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

The paper briefly reviews typical data collected at nuclear plants and questions whether more definitive information is required to ensure that the risk cancer from radiation exposure can be adequately addressed in the future. Activities by the National Research Council, National Institute of Health, Department of Energy, Nuclear Regulatory Commission, are briefly reviewed, as is the recent study, Federal Research on the Biological and Health Effects of Ionizing Radiation. A potential role for the Health Physics Society is identified.

55022 (CONF-830101—, pp 240-243) **Computerized micrographics in processing hard-copy records for an epidemiologic study.** Robie, D.M.; Fry, S.A. (Oak Ridge Associated Univs., TN). 1983. NTIS, PC A24/MF A01. Contract AC05-76OR00033.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

The availability of computers with increasing capabilities has made feasibile epidemiologic studies involving large populations such as those utilized to evaluate the health effects of occupational exposure to radiation. However, the storage and retrieval of data from the large numbers of hard-copy personnel, health physics, employment medical, historical or anecdotal documents that are the bases of such studies pose major logistics problems to investigators. The potential value of such records to epidemiologic studies depends, not only on their accuracy and completeness, but also on ease of accessibility. To address the latter problem, we are using a stand-alone user-oriented electronic filing system that records, stores, and secures hard-copy documents micrographically. This system is controlled by a computer that provides retrieval of a document image and printed copy (if desired) in less than 30 seconds from a maximum of eight fields. One thousand documents are randomly filmed and indexed on computer storage diskettes in two hours. Manual sorting and filing of the same number of documents takes over a day. At present two thousand documents can be recorded on each microfilm roll and 85,000 documents indexed on each diskette. Simultaneous searching for documents can be done using up to ten terminals while indexing is being done at the main terminal. The micrographics system provides the space-saving and security advantages of microfilm with the speed of computerized data retrieval.

55023 (CONF-830101—, pp 244-251) **Relative and absolute risk in epidemiology and health physics.** Goldsmith, R. (Department of Energy, Washington, DC); Peterson, H.T. Jr. 1983. NTIS, PC A24/MF A01.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

The health risk from ionizing radiation commonly is expressed in two forms: (1) the relative risk, which is the percentage increase in natural disease rate and (2) the absolute or attributable risk which represents the difference between the natural rate and the rate associated with the agent in question. Relative risk estimates for ionizing radiation generally are higher than those expressed as the absolute risk. This raises the question of which risk estimator is the most appropriate under different conditions. The absolute risk has generally been used for radiation risk assessment, although mathematical combinations such as the arithmetic or geometric mean of both the absolute and relative risks, have also been used. Combinations of the two risk estimators are not valid because the absolute and relative risk are not independent variables. Both human epidemiologic studies and animal experimental data can be found to illustrate the functional relationship between the natural cancer risk and the risk associated with radiation. This implies that the radiation risk estimate derived from one population may not be appropriate for predictions in another population, unless it is adjusted for the difference in the natural disease incidence between the two populations. (DMT)

55024 (CONF-830101—, pp 252-269) **Development of cancer risk estimates from epidemiologic studies.** Webster, E.W. (Massachusetts General Hospital, Boston, MA). 1983. NTIS, PC A24/MF A01.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

Radiation risk estimates may be made for an increase in mortality from, or for an increase in incidence of, particular types of disease. For both endpoints, two numerical systems of risk expression are used: the absolute risk system (usually the excess deaths or cases per million persons per year per rad), and the relative risk system (usually excess deaths or cases per year per rad expressed as a percentage of those normally expected). Risks may be calculated for specific age groups or for a general population. An alternative in both risk systems is the estimation of cumulative of lifetime risk rather than annual risk (e.g. in excess deaths per million per rad over a specified long period including the remainder of lifespan). The derivation of both absolute and relative risks is illustrated by examples. The effects on risk estimates of latent period, follow-up time, age at exposure and age standardization within dose groups are illustrated. The dependence of the projected cumulative (lifetime) risk on the adoption of a constant absolute risk or constant relative risk is noted. The use of life-table data in the adjustment of cumulative risk for normal mortality following single or annual doses is briefly discussed.

55025 (CONF-830101—, pp 290-297) **Public perceptions of risk.** Mann, J.M. (Health and Environment Department, Santa Fe, NM). 1983. NTIS, PC A24/MF A01.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

Public perceptions of risk will probably always be unsatisfying to a scientist. Public perceptions are formed by the actions of institutions which have goals other than formation of an informed public opinion, such as the schools, the media, business and the government. In this environment, it seems unrealistic to expect public opinion to reflect scientific realities. The talk will focus on the media as an opinion-former and will discuss several non-nuclear issues as illustrations: plague in New Mexico, Toxic Shock Syndrome, and Injuries as a Public Health Problem. Ultimately howev-

er, we are confronted with two wonderfully complex matters: can risk be adequately expressed or measured in universally comprehensible or broadly acceptable terms; and the mysterious movements of the public and collective mind.

55026 (CONF-830101—, pp 308-317) **Age and dose as determinants of times of appearance of radium-induced osteosarcomas in humans.** Stebbings, J.H.; Lucas, H.F. (Argonne National Lab., IL). 1983. NTIS, PC A24/MF A01. Contract W-31-109-ENG-38.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

Determinants of time-until-tumor for bone sarcomas in US radium cases have been reevaluated. For the 57 measured female bone sarcoma cases exposed to ^{226}Ra and/or ^{228}Ra, ages at appearance of tumor are more strongly correlated with radium intake doses than are latency periods. Ages at appearance of tumor increase as initial radium intakes decrease. As many lower dose cases were iatrogenic cases exposed in mid-adult life, rather than about age 22 as for the dial worker cases, these results may be artifactual, resulting from an increased susceptability to sarcoma induction at older ages. Alternatively the time of appearance of a sarcoma may be in part directly determined by age. Both explanations find support in the literature. These results suggest that $^{226,228}Ra$-induced bone sarcomas do have an expression period. The downturn in sarcoma incidence at very high doses may result from truncation of the expression period on its early side by the minimum induction period.

55027 (CONF-830101—, pp 328-337) **Mortality among plutonium and other workers at a nuclear facility.** Wilkinson, G.S.; Voelz, G.L.; Acquavella, J.F.; Tietjen, G.L.; Reyes, M.; Brackbill, R.; Wiggs, L. (Los Alamos National Lab., NM). 1983. NTIS, PC A24/MF A01. Contract W-7405-ENG-36.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

Mortality among plutonium and other nuclear workers has been investigated to assess the effects of exposures to low levels of internal and external radiation. Standarized mortality ratios (SMRs) for white male workers employed at least two years from 1951 through 1977 were significantly lower than expected for all causes, all cancers, cancers of the respiratory system, and lung cancer. Benign neoplasms, all of which were intracranial tumors, were significantly elevated. No bone cancers were discovered and other radiogenic cancers did not differ significantly from expectation. Duration of employment and latency did not affect these results. SMRs for a subcohort of plutonium exposed workers were significantly low for all causes of deaths and all cancers. Estimates of relative risk for workers exposed to 2 or more nCi compared to unexposed workers were not significantly higher or lower than unity. These findings do not support the hypothesis of increased mortality among plutonium and other nuclear workers. The excess for benign and unspecified intracranial tumors is not consistent with previous studies on radiation induced brain tumors in terms of latency and exposure levels.

55028 (CONF-830101—, pp 357-390) **Model or metaphor. More comments on the BEIR III report.** Herbert, D.E. (Univ. of South Alabama, Mobile). 1983. NTIS, PC A24/MF A01.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

Data have been obtained for Hiroshima and Nagasaki from which were prepared the estimates of somatic risk coefficients for ionizing radiation presented in the BEIR III Report. Several Poisson regression models of these data by both Bayesian and Sampling Theory methods. The results of the evaluations disclose some interesting idiosyncracies in the statistical methods by which the BEIR III estimates and inferences were obtained. The paper presents these results in the format of a textual criticism of the foundations of the received estimates of risk that are presented in the Somatic Effects Sections of the BEIR III Report. Whatever the resolution of the current difficulties with the validity of the T65 estimates of dose, the utility of any estimates of risk coefficients depends upon the suitability of the statistical methods by which any estimates of dose are mapped into estimates of risk. The statistical methods of the BEIR III Report seem idiosyncratic. Use of standard methods discloses that its rival models (LQ-L, L-L AND Q-L) may be more effective as metaphors of expression than as models of radiation response.

55029 (CONF-830101—, pp 398-406) **Lung cancer among workers at a uranium processing plant.** Cookfair, D.L. (Roswell Park Memorial Inst., Buffalo, NY); Beck, W.L.; Shy, C.; Lushbaugh, C.C.; Sowder, C.L. 1983. NTIS, PC A24/MF A01. Contract AC05-76OR00033.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

This study examined the risk of dying from lung cancer among white males who received radiation to the lung as a result of inhaling uranium dust or the dust of uranium compounds. Cases and controls were chosen from a cohort of workers employed in a uranium processing plant during World War II. Cumulative radiation lung dose among study population members ranged from 0 to 75 rads. Relative risk was found to increase with increasing level of exposure even after controlling for age and smoking status, but only for those who were over the age of 45 when first exposed. A statistically significant excess in risk was found for men in this age group with a cumulative lung dose of 20 rads of more. These data suggest that older age groups may be more susceptible to radiation-induced lung cancer than younger age groups.

55030 (CONF-830101—, pp 417-426) **Use of PRIM code to analyze potential radiation-induced genetic and somatic effects to man from Jackpile-Paguate mines.** Momeni, M.H. (Argonne National Lab., IL). 1983. NTIS, PC A24/MF A01.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

Potential radiation-induced effects from inhalation and ingestion of land external exposure to radioactive materials at the Jackpile-Paguate uranium mine complex near Paguate, New Mexico, were analyzed. The Uranium Dispersion and Dosimetry (UDAD) computer code developed at Argonne National Laboratory was used to calculate the dose rates and the time-integrated doses to tissues at risk as a function of age and time for the population within 80 km of the mines. The ANL computer code Potential Radiation-Induced Biological Effects on Man (PRIM) then was used to calculate the potential radiation-induced somatic and genetic effects among the same population on the basis of absolute and relative risk models as a function of duration of exposure and age at time of exposure. The analyses were based on the recommendations in BEIR II and WASH-1400 and the lifetable method. The death rates were calculated for radiation exposure from the mines and for naturally induced effects for 19 age cohorts, 20 time intervals, and for each sex. The results indicated that under present conditions of the radiation environment at the mines, the number of potential fatal radiation-induced neoplasms that could occur among the regional population over the next 85 years would be 95 using the absolute risk model, and 243 using the relative risk model. Over the same period, there would be less than two radiation-induced genetic effects (dominant and multifactorials). After decommissioning f the mine site, these risks would decrease to less than 1 and less than 3 potential radiation-induced deaths under the relative and absolute risk models, respectively, and 0.001 genetic disorders. Because of various sources of error, the uncertainty in these predicted risks could be a factor of five.

55031 (CONF-830101—, pp 428-435) **Mortality patterns among a retrospective cohort of uranium mill workers.** Waxweiler, R.J.; Archer, V.E.; Roscoe, R.J.; Watanabe, A.; Thun, M.J. (National Inst. for Occupational Safety and Health, Cincinnati, OH). 1983. NTIS, PC A24/MF A01.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

The long-term health effects associated with the milling of uranium ore are of interest particularly because of exposures to uranium and thorium-230. Excess risks of pulmonary and lymphatic malignancies have been suggested by previous epdiemiologic studies of persons milling or smelting uranium ores, and nephrotoxic effects of uranium have been reported in both man and animals. To test these three previously reported associations and to assess all

cause-specific mortality patterns among uranium mill workers, we carried out a retrospective cohort study of 2002 uranium millers employed in any of seven mills at least one year before 1972. Ninety-eight percent (98%) followup of the cohort through 1977 resulted in 533 deaths observed versus 605 expected from US White male mortality rates. Mortality from most causes was lower than expected. Significant excess risks were found only for nonmalignant respiratory disease and miscellaneous accidents but not for any of the three diseases of a priori interest. However, nonsignificant excesses were found for lymphatic malignancies after 20 years latency and for death due to chronic nephritis among short-term workers.

55032 (CONF-830101—, pp 436-443) **Radiation dosimetry for epidemiology lung cancer study.** Beck, W.L. (Oak Ridge Associated Univs., TN); Cookfair, D.L.; Sowder, C.L.; Gissel, K. 1983. NTIS, PC A24/MF A01. Contract AC05-76OR00033.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

Lung doses have been calculated for 999 workers whose primary exposure was to airborne uranium during the period 1943 to 1947. Internal dose calculations were needed because the major exposure potential was to airborne uranium and because no external monitoring data exists. The lung dose estimates process was divided into two phases: estimation of the uranium intake and calculation of the internal dose. The intake information required included the number of hours worked and the concentration, chemical and physical forms of uranium. These factors were determined through researching historical documents including plant process descriptions, personnel records, operations records, monitoring records, etc. Additional information was also gained through interviews of former plant workers. Job titles and department codes were used to relate uranium exposure conditions to a given individual. Lung doses were estimated using internal dose models developed by Oak Ridge National Laboratory. This system takes into account both particle size and solubility class. Results show that some workers may have received doses as high as 74 rads or 740 rems if a quality factor of 10 is used. The results of this study have been used in a lung cancer case control study to be reported at this conference.

55033 (CONF-830101—, pp 444-454) **Studies of Grants, New Mexico, uranium miners: status as of December, 1982.** Samet, J.M. (Univ. of New Mexico, Albuquerque); Morgan, M.V.; Buechley, R.W.; Key, C.R.; Valdivia, A.A. 1983. NTIS, PC A24/MF A01.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

The report summarizes the current status of the Uranium Epidemiology Study at the University of New Mexico which was initiated in 1977 with the objective of examining mortality among uranium miners in the Grants mineral belt. Adequate historical information has been obtained on exposure for most subjects, and the dose range complements levels in the literature on health effects of radon daughters. Two separate cohorts are being developed to capitalize on this research opportunity. A prevalence survey of respiratory abnormalities has been completed. Future activities for the cohort of earlier miners will include estimation of exposures, completion of follow-up, and an analysis of lung cancer mortality in relation to WLM. (JMT)

55034 (CONF-830101—, pp 461-469) **Canine neoplasia and exposure to uranium mill tailings in Mesa County, Colorado.** Reif, J.S.; Schweitzer, D.J.; Ferguson, S.W.; Benjamin, S.A. 1983. NTIS, PC A24/MF A01.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

A canine cancer registry was established for Mesa County, Colorado in order to collect material for a case control analysis of exposure to uranium tailings. Between 1979 and 1981, 212 cases of canine cancer were confirmed histologically. Based on the address provided at the time of diagnosis, 33 dogs (15.6%) lived in a house with some exposure to uranium tailings. A control group, comprised of dogs with a histologic diagnosis other than cancer, was stratified according to hospital and matched with cases on a 1:1 basis. No significant differences were noted with respect to exposure to uranium tailings for total cancers or cancers of specific sites including lymph node, breast, liver, testicle and bone. The overall estimated relative risk was 0.70 (95% CI 0.04 to 1.16). Canine population estimates were derived for Mesa County in order to develop crude incidence rates for the major types and sites of cancer. Crude rates were compared with those published previously for Alameda County, California and Tulsa County, Oklahoma. Mesa County rates for total cancer incidence, connective tissue tumors and non melanoma skin cancer were higher than those reported for Alameda County. When compared with Tulsa County, Mesa County rates for total cancer, breast cancer, melanoma and mastocytoma were lower than expected while rates for osteosarcoma, hemangiosarcoma and fibrosarcoma significantly exceeded expected values.

55035 (CONF-830101—, pp 470-483) **Lung cancer mortality and indoor radon concentrations in 18 Canadian cities.** Letourneau, E.G.; Mao, Y.; McGregor, R.G.; Semenciw, R.; Smith, M.H.; Wigle, D.T. (National Health and Welfare, Ottawa, Ontario). 1983. NTIS, PC A24/MF A01.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

Indoor radon and radon daughter concentrations were measured in a survey of 14,000 homes in 18 Canadian cities conducted in the summers of 1978 through 1980. Mortality and population data for the period 1966 through 1979 were retrieved for the geographic areas surveyed in each city. The results of analysis of the relation between lung cancer and radon daughter concentration, smoking habits and socioeconomic indicators for each city showed no detectable association between radon daughter concentrations and lung cancer mortality rates with or without adjustment for differences in smoking habits between cities.

55036 (CONF-830101—, pp 484-494) **Cancer incidence study in Mesa County, Colorado.** Ouimette, D.R. (Colorado Dept. of Health, Denver); Ferguson, S.W.; Zoglo, D.; Murphy, S.; Alley, S.; Bahler, S. 1983. NTIS, PC A24/MF A01.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

In November of 1982 the Colorado Department of Health completed an epidemiologic investigation of leukemia, multiple myeloma, and cancers of the lung, stomach, pancreas and colon in Mesa County, Colorado for the years 1970 to 1979. This investigation was performed in response to a concern that the presence of uranium mill tailings in some Mesa County homes presents a potential cancer hazard. The results of the investigation show that the incidence of multiple myeloma, colon, stomach and pancreatic cancer are not above expected rates. The incidence of leukemia is not above expected rates for the entire study period, 1970 to 1979. The incidence of lung cancer appears elevated when compared to the The Third National Cancer Survey data for Colorado but lower than expected when compared to Surveillance, Epidemiology and End Results data. To further examine the leukemia and lung cancer incidence findings, a case/control study was conducted. The controls consisted of colon, stomach and pancreatic cancer cases. The results of the leukemia case/control analysis show no association with the radiation exposure variables: occupational radiation exposure; uranium mining exposure; having ever lived in a type A home (uranium tailings home); and radiation therapy. The lung cancer case/control analysis shows a significant association with only the radiation exposure variable, uranium mining history, indicating cases were more likely to have been uranium miners than were controls. As with leukemia, the study found no association between lung cancer and living in a uranium mill tailings home. The relatively low radiation exposures typical of type A homes and the small number of persons exposed make it very difficult to establish, by epidemiologic methods, that a risk exists.

55037 (CONF-830101—, pp 495-503) **Critical review of the Hanford worker studies: cancer risk and low-level radiation.** Savitz, D.A. (Univ. of Colorado, Denver). 1983. NTIS, PC A24/MF A01.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

Current estimates of cancer risks attributable to low-level radiation exposure are extrapolated from effects observed at higher doses. The inherent uncertainties in this approach make direct study

of low-dose effects in human populations of great significance. Employees of the Hanford works in Richland, Washington constitute a large group of workers exposed to low-level radiation. The cancer mortality patterns in relation to radiation dose have been discussed by numerous investigators beginning with Mancuso, Stewart, and Kneale in 1977 and continuing to the present. These studies and their published critiques are summarized, with an effort to account for discrepant results by careful review of the analytic methods. Detailed consideration is given to exposure definition, classification of health outcomes, latency, the statistical methods employed, and selection biases. From this, it is concluded that (a) total cancers are unrelated to radiation exposure among these workers; (b) multiple myeloma and pancreatic cancer show a positive association with radiation dose based upon a few highly exposed cases; and (c) the relationship of radiosensitive cancers in the aggregate to radiation exposure is unresolved. Further study of the temporal course of exposure and latency in a classical cohort analysis of radiosensitive cancers might be informative, with special attention to the possibility of selection for jobs within the cohort.

55038 (CONF-830101—, pp 504-517) **Impact of radiobiological considerations on epidemiological inferences of age-dependent radiosensitivity.** Crawford-Brown, D.J. (Univ. of North Carolina, Chapel Hill). 1983. NTIS, PC A24/MF A01. Contract AC05-76OR00033.

From Epidemiology applied to health physics conference; Albuquerque, NM, USA (10 Jan 1983).

Current epidemiological studies of the age-dependent risk of radiogenic carcinomas are based on populations still in the early stages of cancer expression. The result is a set of logical uncertainties concerning the manner in which inferences may be drawn from the existing data. These uncertainties may be formalized and examined through the application of various radiobiological principles developed from more fundamental experimental data. Chief amongst these considerations are the time course of tumor expression, the role of relative and absolute risk models, the distribution of effects between initiation and promotion, the age-dependent fraction of time a critical cell remains in radiosensitive stages and the combinatorics of the critical cellular subpopulations. Each of these and the combinatorics of the critical cellular subpopulations. Each of these principles are examined in light of their impact on the structuring of epidemiologic data and the drawing of inferences concerning age-dependent radiogenic risk. The data on atomic bomb survivors are employed as a relevant example.

55039 **(DOE/NBM—3015766) Detection of deletion mutations at the gpt locus in pSV2gpt transformed CHO cells.** Tindall, K.R.; Hsie, A.W. (Tennessee Univ., Oak Ridge (USA). Graduate School of Biomedical Sciences; Oak Ridge National Lab., TN (USA)). 1983. Contract W-7405-ENG-26. 12p. NTIS, PC A02/MF A01. Order Number DE83015766.

Portions are illegible in microfiche products.

Deletion mutations were detected at the gpt locus in HGPRT-deficient CHO cells transformed by the pSV2gpt plasmid vector. The purine analog, 6-thioguanine (TG), is metabolized by XGPRT and was shown to be applicable for the isolation of mutants at the gpt locus in one pSV2gpt transformed CHO cell line carrying a single copy of the gpt gene. Induction of TG/sup r/ mutants in this cell line by x-rays was quantifiable. Specific deletions of pSV2gpt sequences in two TG/sup r/ mutants were detected by blot hybridization. The sites of these depletions provide a molecular basis for the observed TG/sup r/ phenotype. 17 references.

55040 **(EHD—81-72) Occupational radiation exposures in Canada - 1979.** Ashmore, J.P.; Fujimoto, K.R.; Wilson, J.A.; Grogan, D. (Department of National Health and Welfare, Ottawa, Ontario (Canada)). Dec 1980. 83p. (In English, French). (EHD—82-72). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83703442.

This report is the second in a series of annual reports on Occupational Radiation Exposures in Canada. The data is derived from the Radiation Protection Bureau's National Dose Registry which includes dose records for radiation workers in Canada. The report presents average yearly doses by region and occupational category, dose distributions, and variation of average doses with time. Statistical data concerning investigations of high exposures are included and individual cases are briefly summarized where the maximum permissible dose is exceeded. The 1979 data indicate that the gradually decreasing trend of the last two decades may be changing. In a number of areas the overall average doses and the averages for some job categories have increased over the corresponding values for 1977 and 1978.

55041 **(EUR—7157-EN) Assessment of plutonium internal contamination in man.** Clemente, G.F.; Site, A.D. (Commission of the European Communities, Luxembourg). [nd]. 186p. NTIS, PC E08/MF E08.

A critical analysis is made of methods which are currently applied to the assessment of plutonium internal contamination. A brief review of the metabolic behavior of plutonium and americium is given with particular reference to the retention and excretion functions which may be applied to evaluate the systemic and lung burdens on the basis of the excretion data. The direct and indirect methods are analysed in detail. Particular attention is paid to the calibration techniques (phantom and in vivo) used in lung plutonium counts and to the evaluation of chest-wall thickness and its effects.

55042 **(IAEA-R—2561-F) Rice protein improvement through mutation breeding techniques, advance evaluations. Part of a coordinated programme on use of nuclear techniques for cereal grain protein improvement. Final report for the period 1 March 1980 - 31 December 1982.** Kartoprawiro, I.M. (International Atomic Energy Agency, Vienna (Austria)). Jan 1983. 16p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703561.

The use of gamma radiations for improving protein content of rice variety Pelita I/1 yielded mutants which were consistently high in protein level. However, only a very few have a good TD value. One is mutant 627/5-PnJ which has a good chance to be officially released because it is resistant to BPH, has high yielding potential, good eating quality, early maturity and high tolerance to salinity. The environmental conditions, such as heterogeneity of soil, amount of N-fertilizer and reproducibility of method for protein determination have significant effects on the variability of protein content in certain genotypes of rice.

55043 **(IAEA-R—2616-F) Effects of uranium compounds on skin. Final report for the period 1 July 1980 - 31 October 1982.** de Rey, B.M. (International Atomic Energy Agency, Vienna (Austria)). Dec 1982. 40p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83703560.

The following uranium compounds were topically applied to the dorsal skin of 35 day-old Wistar rats (60 g, male): uranium dioxide, uranyl nitrate, uranyl acetate, ammonium uranyl tricarbonate and ammonium diuranate. Percutaneous absorption was mediated with the aid of a vehicle and known quantities of various particle-sized batches of uranium compounds were directly implanted in the subcutaneous tissue. Animals were sacrificed 3, 6, 24 and 48 hours after implantation. Subcutaneous tissue and muscle underneath the implantation site were anlaysed by light and electron microscopy. A Cameca 322 X-ray microanalyzer was used to analyze uranium traces in calcified tissue (bones and teeth) and kidneys. A steady loss in body weight was observed in animals given high concentration of uranyl nitrate and ammonium uranyl tricarbonate. All animals died five days after the onset of the experiment due to renal failure. Slightly soluble compounds, ammonium diuranate and uranyl acetate, caused only a slight decrease in body weight. Uranium dioxide, the most insoluble compound used, induced only a transitory slight body weight decrease. Histopathological study revealed damages to the tissues of topicated skin, hair follicles and adnexal glands. High concentration of uranium was indicated in bone, teeth and kidneys by X-ray scanning.

55044 **(ISH—17) Strontium-90 in the teeth of Bavarian children.** Dehos, R. (Bundesgesundheitsamt, Neuherberg (Germany, F.R.). Inst. fuer Strahlenhygiene). Jan 1983. 19p. (In German). Available from Bundesgesundheitsamt, Neuherberg (Germany, F.R.).

In the framework of the research project "Determination of the stontium-90 content in human bones, soft tissues and dis-

charges", the teeth of children born from 1964 to 1978 in the areas Allgaeu, Munich (north), Landshut and Guenzburg were tested for their contents of strontium 90. The highest values were found for the Allgaeu area, the lowest for that of Guenzburg. The measured results are clearly attributable to the differences in fallout from nuclear weapons tests in the atmosphere. In areas with higher precipitations more strontium 90 is deposited on the earth surface than in areas with less precipitations. Strontium 90 reaches the human body via food and is irreversibly stored in the teeth during the phase of tooth formation. With its completion, the storage ceases. Within one area the older children exhibit a slightly higher concentration of strontium 90. This is due to the fact that the yearly amount of strontium 90 from the fallout of above-ground nuclear weapons tests has been decreasing since 1964. The measuring results are unequivocally related to the known regional differences in the fallout of nuclear weapons tests and give no clues to the, allegedly, increased emission of strontium 90 from a research reactor north of Munich.

55045 (SSA—1982-TS-3, pp 200-203) **Bactericidal effect of ultraviolet irradiation.** Van Doren, C.; Millier, E.; Gauthier, Y.; Isoard, P. 1982. (In French). NTIS (US Sales Only). In 1981 Scientific works.

55046 **(WIPP-DOE—176) Estimates of internal-dose equivalent from inhalation and ingestion of selected radionuclides.** Dunning, D.E. (Evaluation Research Corp., Oak Ridge, TN (USA)). 1982. Contract AC04-78AL05346. 79p. NTIS MF A01. Order Number DE83017998.

Microfiche only, copy does not permit paper copy reproduction. Original copy available until stock is exhausted.

This report presents internal radiation dose conversion factors for radionuclides of interest in environmental assessments of nuclear fuel cycles. This volume provides an updated summary of estimates of committed dose equivalent for radionuclides considered in three previous Oak Ridge National Laboratory (ORNL) reports. Intakes by inhalation and ingestion are considered. The International Commission on Radiological Protection (ICRP) Task Group Lung Model has been used to simulate the deposition and retention of particulate matter in the respiratory tract. Results corresponding to activity median aerodynamic diameters (AMAD) of 0.3, 1.0, and 5.0 μm are given. The gastorintestinal (GI) tract has been represented by a four-segment catenary model with exponential transfer of radioactivity from one segment to the next. Retention of radionuclides in systemic organs is characterized by linear combinations of decaying exponential functions, recommended in ICRP Publication 30. The first-year annual dose rate, maximum annual dose rate, and fifty-year dose commitment per microcurie intake of each radionuclide is given for selected target organs and the effective dose equivalent. These estimates include contributions from specified source organs plus the systemic activity residing in the rest of the body; cross irradiation due to penetrating radiations has been incorporated into these estimates. 15 references.

55047 **Cell labeling: radiation dose and effects.** Watson, E.E. (Oak Ridge Associated Universities, TN). *Journal of Nuclear Medicine;* **24**: No. 7, 637-640(Jul 1983). Contract AC05-76OR00033.

An editorial is presented which considers some aspects of the problems associated with studies utilizing radioactively labeled blood cells. For many years, nuclear medicine researchers have sought agents to successfully label cellular blood elements with radionuclides to determine the fate of the cells by both external imaging and in vitro measurements. The labeling procedure must have no effect on functional activities of the cells, and there must be little or no spontaneous release of the radioactive label. Several different radioactive labels (Cr-51, Tc-99m, In-111) have been used, and are discussed in this editorial.

55048 **Guest editorial: concern over recent use of the ALARA philosophy.** Auxier, J.A.; Dickson, H.W. (Oak Ridge National Lab., TN). *Health Physics;* **44**: No. 6, 595-600(Jun 1983). Contract W-7405-ENG-26.

The as-low-as-reasonably-achievable (ALARA) philosophy as it applies to personnel radiation exposure has been with us for a long time. The essential tenets of this philosophy surfaced quite early in the history of the Manhattan Project. Although the terminology has suffered through various translations and the application has seen many organizations and agencies come and go, the principles remain as valid today as ever. It is regretable that some regulatory agencies claim ALARA as their new-found miracle drug and that application according to their prescriptions will result in endless rounds of cyclical improvement in radiation protection practices. Others have taken advantage of the popularity of ALARA and have bastardized the philosophy to mean whatever is expedient for their purposes. In this editorial, the history of ALARA and what it seemingly means to different interest groups is reviewed and a balanced viewpoint that the authors hope health physicists will adopt is offered.

55049 **Calculating the gastrointestinal tract activity following the inhalation of a radioactive aerosol.** Maillie, H.D. (Univ. of Rochester, NY). *Health Physics;* **44**: No. 6, 662-666(Jun 1983). Contract AC02-76EV03490.

The International Commission on Radiological Protection (ICRP) has considered the case of a worker who has inhaled a radioactive aerosol (ICRP79a). Results presented for specific radioisotopes include the number of transformations that have occurred over a 50 year period in the lung, the gastrointestinal (GI) tract and selected organs. The differential equations involved in the lung model use specific removal constants for each respiratory tract compartment. The values for these parameters depend only on the class of aerosol. Therefore, for a given class of aerosol with a specific concentration, the only two variables needed to determine the uptake of radioactivity in the lungs are the half-life of the radioisotope and the duration of the inhalation exposure. This has been shown for an activity median aerodynamic diameter (AMAD) of one micrometer (μm). The purpose of this communication is to examine a simple method of estimating the uptake of radioactivity by the GI system following the inhalation of radioactive aerosols with an AMAD of 1 μm.

55050 **Body burden estimation of ^{32}P by measurement and calibration of bremsstrahlung radiation produced in the skull.** Cohen, N. (New York Univ., NY); Neton, J.W.; Laurer, G.R.; Dettman, G. *Health Physics;* **44**: No. 6, 668-671(Jun 1983). Contract AC02-77EV04326.

It recently became necessary to determine the body burden of an individual who was internally contaminated with ^{32}P. From detailed investigations, it was clear that the exposure occurred as a result of a single ingested dose of ^{32}P labeled adenosine triphosphate [^{32}P(ATP)]. Since ATP is known to be highly unstable in the digestive tract, it was assumed in this case that the ^{32}P was metabolized in the same way as it would have been if it had been ingested as inorganic phosphate. Although the estimation of the initial body burden would normally be accomplished after measurement of sequential daily urine collections, this technique was complicated by the early administration of phosphate compounds and excess fluids (phosphate diuresis) in an attempt to accelerate the normal excretion of the ^{32}P ingested. Consequently, the body burden was estimated from in vivo ^{32}P measurements (i.e. bremsstrahlung produced by ^{32}P β decay) made in a whole body counter with three NaI-CsI(Tl) scintillation detectors surrounding the head. A calibration structure of the skull, i.e., phantom, was constructed by applying ^{32}P to all inner and outer surfaces of an actual human skull and then covering the structure with an appropriate thickness of paraffin.

55051 **Molecular cloning and analysis of the endogenous retrovirus chemically induced from RFM/Un mouse cell cultures.** Liou, R.S. (Univ. of Tennessee-Oak Ridge Graduate School of Biomedical Sciences, Oak Ridge); Boone, L.R.; Kiggans, J.O.; Yang, D.M.; Wang, T.W.; Tennant, R.W.; Yang, W.K. *Journal of Virology;* **46**: No. 1, 288-292(Apr 1983). Contract W-7405-ENG-26.

An N-tropic ecotropic retrovirus induced with iododeoxyuridine from RFM/Un mouse cell cultures was molecularly cloned and analyzed. Based on the restriction map, the RFM/Un virus appears to be indistinguishable from other induced N-tropic retroviruses. A nucleotide sequence analysis of the long terminal repeat of an infectious clone revealed structural features characteristic of

murine type C retrovirus long terminal repeats. The U3 region of the RFM/Un virus long terminal repeat, however, contained no short sequence duplication or insertion found in other murine leukemia virus isolates.

55052 **Suppressive action of near-ultraviolet light on ouabain resistance induced by far-ultraviolet light in Chinese hamster cells.** Suzuki, F.; Han, A.; Hill, C.K.; Elkind, M.M. (Argonne National Lab., IL (USA). Mammalian Cell Biology Group). *Mutation Research;* **119**: No. 3/4, 399-406(Mar 1983).

The interaction between ultraviolet light (UV-C) from germicidal lamps (254 nm) and near-ultraviolet light (UV-B) from Westinghouse Sun Lamps (290-345 nm) was studied in Chinese hamster V79 cells by measuring the effectiveness of combined exposures to induce the resistance to 6-thioguanine or to ouabain. Exposure of cells to a conditioning dose of UV-B (approx.=70% survival) results in significant inhibition of the induction by UV-C of cells resistant to ouabain. The inhibition is lost, however, if cells are incubated for 12 h at 37°C between exposures. Inhibition is also observed when cells are preirradiated with a dose of UV-B filtered with polystyrene (300-345 nm) which, in itself, has no effect on cell killing. Conditioning exposures of unfiltered or filtered UV-B light do not inhibit the induction of 6-thioguanine-resistant cells by UV-C light, and the effects of UV-B and UV-C light are largely independent.

55053 **Comparison of stem-spermatogonial renewal and mitotic activity in the γ-irratiated mouse and rat.** Erickson, B.H.; Hall, G.G. (Oak Ridge Associated Univ. Inc., TN (USA). Comparative Animal Research Lab.). *Mutation Research;* **108**: No. 1-3, 317-335(Mar 1983).

With many refs.

The Sprague-Dawley rat exceeds the CRF_1 mouse in number of isolated or purported stem cells per unit area of seminiferous tubule by a factor of 2.1, yet the mouse exceeds the rat in number of first-generation spermatogonia (A_1) per unit of tubule by a factor of 1.8. This difference could lead to an interspecies difference in irradiation response and help clarify the identity of spermatogonial stem cell. To test this thesis, mice and rats were irradiated with 600 R of ^{60}Co γ-radiation and killed at postirradiation intervals of 1-16 weeks. Both tubular whole mounts and cross sections were evaluated. The species did not differ in percent survival of isolated spermatogonia, but the mouse exceeded the rat in survival and/or production of A_1 or clonal spermatogonia by a factor of 5. By week 16 after irradiation, the mouse restis had regained 67% of its preirradiation weight, in contrast to the rat's 52%. Clonal renewal was in progress by the end of the 2 (mouse) and 3 (rat) weeks and was substantially complete by the 8 week. In both species the isolated population, however, diminished throughout the first 8 weeks and was renewed between 8 and 16 weeks. Clonal renewal was not accompanied by an increase in the number of isolated spermatogonial mitoses, but was accompanied by increases in the mitotis of pairs and clones and the apparent splitting of existing clones to form additional clones. Thus, the mouse's superiority in the rate and completeness of spermatogonial renewal was apparently due to the attributes of the undifferentiated A_1 spermatogonial clone.

55054 **Fragmentation of inhaled $^{238}PuO_2$ particles in lung.** Diel, J.H.; Mewhinney, J.A. (Lovelace Biomedical and Environmental Research Inst., Albuquerque, NM). *Health Physics;* **44**: No. 2, 135-143(Feb 1983). Contract AC04-76EV01013.

Beagle dogs were exposed by inhalation to monodisperse aerosols of $^{238}PuO_2$. Autoradiographs of lung sections were studied for nine dogs sacrificed from 4 to 730 days after exposure. Fragmentation of particles in lung was observed autoradiographically. A simple mathematical model fitted to the fragmentation and lung retention data for dogs suggests that lung clearance from intact particles (65%) and particle fragments (32%) were important to the removal of $^{238}PuO_2$ deposited in the lung by inhalation. The increased surface area resulting from fragmentation should increase dissolution and risk to other organs from irradiation by translocated plutonium.

55055 **Whole-body and part-body turnover of ^{85}Sr in Paget's disease.** Tothill, P.; Smith, M.A. (Royal Infirmary, Edinburgh (UK)); Cohn, S.H. (Brookhaven National Lab., Upton, NY (USA)). *Physics in Medicine and Biology;* **28**: No. 2, 149-159(Feb 1983).

The whole-body and part-body retention of ^{85}Sr has been measured over a period of 150 days in 12 patients with Paget's disease, seven of whom were treated with calcitonin, starting 60 days after the ^{85}Sr administration. Retentions were compared with those in a group of seven control subjects. The retention data were analysed using multiple exponential, single and double power-law and combined power law and exponential functions. The mean retention of ^{85}Sr over a long period was greater in the Paget's patients than in the controls, 1.9 times at two months. No significant effect of calcitonin treatment was demonstrated. Part-body measurements based on profile scanning demonstrated a significantly increased uptake of ^{85}Sr in sites where disease was present. The longer-term rate of disappearance from such sites was faster than from unaffected bones.

55056 **Sterilization of TLD finger monitors.** Pollack, R.W. (Siemens Gammasonics, Inc., Des Plains, IL); Phillip P.C.; Jayaraman, S. *Health Physics;* **45**: No. 1, 157-158(1983).

It is important to measure extremity dose during surgical procedures such as heart catheterizations, yet many doctors are hesitant to wear an unsterilized monitoring device. This note describes our work on the effect of ethylene oxide sterilization on lithium fluoride thermoluminescent dosimeters which has shown that a cold, chemical method may be satisfactorily used.

55057 **Iodine-129 uptake and effects of lifetime feeding in rats.** Book, S.A. (Univ. of California, Davis). *Health Physics;* **45**: No. 1, 61-66(1983).

Irradiation of thyroid glands in rats at a dose rate of approximately 1 rad/day from continually ingested ^{129}I resulted in no significant increase in thyroid tumors compared to controls, nor in other thyroidal effects, nor was there any difference in longevity between the two groups. Marked decreases in ^{131}I uptake by thyroid glands of ^{129}I-fed rats were observed, but these decreases reflected blocking of the thyroid by the large quantities of iodine required because of the low specific activity of ^{129}I. In view of the lack of effects on the thyroid gland invoked by lifetime exposures to ^{129}I, and considering the low specific activity of the radionuclide and the limited capacity of the thyroid gland for iodine, the hazard from ^{129}I appears to be extremely limited.

55058 **Retention of inhaled $^{238}PuO_2$ in Beagles: a mechanistic approach to description.** Mewhinney, J.A.; Diel, J.H. (Lovelace Biomedical and Environmental Research Inst., Albuquerque, NM). *Health Physics;* **45**: No. 1, 39-60(1983). Contract AC04-76EV01013.

Groups of Beagle dogs received inhalation exposure to one of three sizes of monodisperse or a polydisperse aerosol of $^{238}PuO_2$. Periodic sacrifice of pairs of dogs through 4 yr after inhalation exposure provided data on the retention, translocation and mode of excretion of ^{238}Pu. Fragmentation of $^{238}PuO_2$ particles deposited in lung led to enhanced dissolution, translocation and excretion of ^{238}Pu compared to previous studies using $^{239}PuO_2$. A mechanistic simulation model was formulated to account for particle dissolution and fragmentation. This model provided adequate prediction of the time course of lung retention, uptake and retention in other organs and excretion. Predictions of the model provided more accurate description of the data than the Task Group on Lung Dynamics model incorporated in the ICRP Publication 30. The mechanistic model provided estimates of cumulative radiation dose to liver and bone that are a factor of five greater and to lung that are a factor of two less than predicted by the Task Group Lung Model.

55059 **Demographic model for performing site-specific health risk projections.** Collins, J.J.; Lundy, R.T.; Grahn, D. (Argonne National Lab., IL). *Health Physics;* **45**: No. 1, 9-20(1983). Contract W-31-109-ENG-38.

An extension of an earlier life table model for estimating health risks in occupationally exposed workers is presented. The extension of the earlier methodology incorporates specific fertility as-

sumptions and therefore produces a model that is able to perform health risk projections for populations living in or around sites that release agents with potentially adverse health consequences. Results show that fertility patterns are important for assessing risk, even for short-term projections. The interaction of initial age structure, competing risks from other causes of death, and fertility patterns are all important in determining future levels of excess mortality from various pollutants.

55060 **Sensitivity of early mouse embryos to [^{3}H]thymidine.** Spindle, A. (Univ. of California, San Francisco); Wu, K.; Pedersen, R.A. *Experimental Cell Research;* **142**: No. 2, 397-405(Dec 1982).

Effects of intranuclear radiation on the developmental capacity of early mouse embryos were studied by exposing embryos to [^{3}H]thymidine and counting the number of embryos forming blastocysts, trophoblast outgrowths, inner cell masses (ICMs), and two-layer ICMs (differentiated into primary endoderm and ectoderm). When embryos were cultured from the 2-cell stage for 8 days in the continuous presence of [^{3}H]thymidine, concentrations as low as 0.2 nCi/ml reduced the number of embryos forming two-layer ICMs. At 1 nCi/ml, the number of both ICMs and two-layer ICMs were reduced, and at 10 nCi/ml the number of embryos developing to all three post-blastocyst endpoints was reduced. Blastocyst formation was not affected even at the highst concentration [^{3}H]thymidine and then cultured further in unlabelled medium, the effects were similar to those of 8-day exposure. When embryos were exposed to [^{3}H]thymidine for 24 h at various developmental stages, effects were less severe than when they were exposed continuously for 3 or 8 days, and the sensitivity of embryos differed between stages. The 24-h exposure of immunosurgically isolated ICMS to [^{3}H]thymidine revealed that the high sensitivity of the ICM to [^{3}H]thymidine persists through the late blastocyst stage and declines progressively thereafter. Autoradiography indicated that the change in radiosensitivity of embryos or ICMs is generally related to their ability to incorporate [^{3}H]thymidine into the DNA.

55061 **Applicability of the ^{14}C-specific activity model.** Wirth, E. (Oak Ridge National Lab., TN (USA)). *Health Physics;* **43**: No. 6, 919-922(Dec 1982).

In this note the carbon flow in the human food chain is analysed to assess the applicability and accuracy of the specific activity model estimating the ^{14}C dose to man. In this model the specific activity in man is equated to the specific activity in air, thus avoiding concentration factors and intake rates whose parameters are difficult to ascertain.

55062 **Imprecision in estimates of dose from ingested ^{137}Cs due to variability in human biological characteristics.** Schwarz, G.; Dunning, D.E. Jr. (Oak Ridge National Lab., TN (USA)). *Health Physics;* **43**: No. 5, 631-645(Nov 1982).

An attempt has been made to quantify the variability in human biological parameters determining dose to man from ingestion of a unit activity of soluble ^{137}Cs and the resulting imprecision in the predicted total-body dose commitment. The analysis is based on an extensive review of the literature along with the application of statistical methods to determine parameter variability, correlations between parameters, and predictive imprecision. The variability in the principal biological parameters (biological half-time and total-body mass) involved can be described by a geometric standard deviation of 1.2-1.5 for adults and 1.6-1.9 for children/ adolescents of age 0.1-18 yr. The estimated predictive imprecision (using a Monte Carlo technique) in the total-body dose commitment from ingested ^{137}Cs can be described by a geometric standard deviation on the order of 1.3-1.4, meaning that the 99th percentile of the predicted distribution of dose is within approximately 2.1 times the mean value. The mean dose estimate is 0.009 Sv/MBq (34 mrem/μ Ci) for children/adolescents and 0.01 Sv/MBq (38 mrem/μ Ci) for adults. Little evidence of age dependence in the total-body dose from ingested ^{137}Cs is observed.

55063 **Dissolution characteristics of Pu-contaminated soils and sediments in lung serum simulant solution.** Lee, S.Y.; Bondietti, E.A.; Tamura, T. (Oak Ridge National Lab., TN (USA)). *Health Physics;* **43**: No. 5, 663-668(Nov 1982).

Dissolution characteristics of Pu from contaminated Nevada Test Site (NTS) and Rocky Flats (RF) soils, and Mound Laboratory (ML) and Oak Ridge National Laboratory (ORNL) sediments in lung serum simulant solution at 37 deg C were investigated. The dissolved Pu concentration had reached a maximum within a day of equilibration and the percent dissolved Pu at the maximum was 0.70 (RF), 0.43 (ML), 0.02 (ORNL), and 0.02 (NTS). The Pu concentrations of the RF, ML and ORNL samples in the successively extracted solutions decreased drastically but the concentration in the NTS soil extracts did not change significantly. The differences in Pu dissolution among the samples were caused by the differences in the total Pu concentration, particle size distribution, and chemical nature of Pu in contaminated soils and sediments. The higher solubility of the particulate Pu form in the RF soil relative to the ORNL sediment contaminated by dissolved Pu suggests that contamination source alone can not explain the observed differences. Variation of Pu solubility among the samples indicates that a single solubility class for dose assessment use may not be appropriate, particularly if one attempts to make comparative assessments among different sites.

55064 **Toxicology of ^{85}Kr: tissue distribution and retention in the rat.** Ballou, J.E.; Willard, D.H.; DeFord, H.S.; Murphy, D.W. (Pacific Northwest Lab., Richland, WA (USA)). *Health Physics;* **43**: No. 5, 669-677(Nov 1982).

Wistar rats were exposed to ^{85}Kr gas atmospheres to determine saturation/desaturation kinetics in major tissues. Tissue partition coefficients [concentration ^{85}Kr in tissue (μ Ci/g)/concentration of ^{85}Kr in the atmosphere (μCi/cc)] were determined following equilibration with ^{85}Kr gas. Tissue partition coefficients were highest for adrenals and fat; lowest for bone, heart and brain. Tissue partition coefficients for immature rats, 1-12 days of age, and for adults, were not significantly different. The highest concentrations of ^{85}Kr were found in fatty tissues and in gas pockets in the intestinal lumen.

55065 **Neutron and γ-ray effects measured by the micronucleus test.** Garriott, M.L.; Grahn, D. (Argonne National Lab., IL (USA). Biological and Medical Research Div.). *Mutation Research;* **105**: No. 3, 157-162(Sep 1982).

A study currently under way at this laboratory is designed to measure the biological effects of chronic exposure to low weekly doses of γ-rays and neutrons, including dose levels that might be encountered in occupational situations. As a part of this study, the micronucleus test is being employed as a periodic monitor of genetic damage. To facilitate interpretation of the data to be collected from that experiment, baseline values for the rate of induction of micronuclei are required. Therefore was measured dose response following a single radiation exposure and compared the effectiveness of γ-rays and neutrons for inducing micronuclei. The results of this limited study and comparison are reported.

55066 **Estimating the carcinogenetic effects on humans of low doses of radiation or chemicals.** Setlow, R.B. (Brookhaven National Lab., Upton, NY). *Journal of Environmental Science and Health, Part A: Environmental Science and Engineering;* **A17**: No. 4, 599-603(1982).

Our knowledge of DNA repair is briefly summarized. It is proposed that a knowledge of the concentration of DNA adducts as a function of dose is essential for the extrapolation of carcinogenic dose-reponse data to low doses.

5602 Thermal Effects

REFER ALSO TO CITATION(S) 53862

55067 **Mutants of thermotaxis in Dictyostelium discoideum.** Schneider, M.J.; Fontana, D.R.; Poff, K.L. (Michigan State Univ., East Lansing). *Experimental Cell Research;* **140**: No. 2, 411-416(Aug 1982). Contract AC02-76ER01338.

Amoebae of Dictyostelium discoideum, strain HL50 were mutagenized with N-methyl-N'-nitro-N-nitrosoguanidine, cloned, allowed to form pseudoplasmodia and screened for aberrant positive and negative thermotaxis. Three types of mutants were found.

Mutant HO428 exhibits only positive thermotaxis over the entire temperature range (no negative thermotaxis). HO596 and HO813 exhibit weakened positive thermotaxis and normal negative thermotaxis. The weakened positive thermotactic response results in a shift toward warmer temperatures in the transition temperature from negative to positive thermotaxis. Mutant HO209 exhibits weakened positive and negative thermotactic responses and has a transition temperature similar to the 'wild type' (HL50).The two types of mutants represented by HO428, HO596 and HO813 support the model that positive and negative thermotaxis have separate pathways for temperature sensing. The type of mutants which contains HO209 suggests that those two pathways converge at some point before the response.

5603 Chemicals Metabolism And Toxicity

REFER ALSO TO CITATION(S) 53424, 53427, 53428, 53441, 53441, 54937, 54939, 54946, 54949, 54955, 54964, 55066

55068 **(AD-P—000770/8) Inhibition of nitrification by chromium in a biodisc system.** Kang, S.J.; Borchardt, J.A. (McNamee, Porter and Seeley, Ann Arbor, MI (USA)). 1982. 17p. NTIS, PC A02/MF A01.

A series of investigations was undertaken to determine the acceptability of certain industrial wastes containing hexavalent chromium by a biodisc system providing both secondary treatment and biological nitrification. The initial objectives of the study were: to determine the extent to which a biodisc system can tolerate chromium (VI) without losing efficiency in either BOD removal or in nitrification; to establish mechanisms of chromium removal and the benefits of staging, and to understand differences in short and long-term effects and steady state or shock load conditions. These objectives were established to serve a number of purposes. The data gathered will assist municipalities in determining the quantity and characteristics of chromium containing waste that may be accepted without causing interference in operation. The data gathered will also assist design engineers in understanding and better defining the process reliability between an activated sludge and a biodisc system and finally the benefits of staging in an RBC.

55069 **(CONF-8208157—1) Use of the cricket embryo (Acheta domesticus) as an invertebrate teratology model.** Walton, B.T. (Oak Ridge National Lab., TN (USA)). 1982. Contract W-7405-ENG-26. 18p. NTIS, PC A02/MF A01. Order Number DE83015620.

From American Society of Pharmacology and Experimental Therapeutics/Society of Toxicology meeting on innovative models in chemical teratogenesis; Louisville, KY, USA (16 Aug 1982).

Embryos of the cricket Acheta domesticus (L.) have been shown by bioassay to develop gross morphological abnormalities after exposure to a number of complex organic mixtures as well as to display a critical period of teratogen sensitivity and an ability to metabolize xenobiotics during development. Because the assay is simple, inexpensive, short-term (less than two weeks), and objective, it could be useful as an in vivo screen in an hierarchical approach to teratogen detection. Further investigation of cricket embryo responses to known teratogens is needed to establish the predictive value of this assay. 25 references, 1 figure, 2 tables.

55070 **(DP-MS—82-85) Effectiveness of bromicide against Legionella pneumophila in a cooling tower.** Fliermans, C.B.; Harvey, R.S. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 1983. Contract AC09-76SR00001. 13p. (CONF-830387—2). NTIS, PC A02/MF A01. Order Number DE83017508.

From 83. annual American Society of Microbiologists conference; New Orleans, LA, USA (6 Mar 1983).

Cooling towers are considered to be man-made amplifiers of Legionella. Thus the proper maintenance and choice of biocides is important. The only biocide that has thus far been shown to be effective in field tests is the judicious use of chlorination. Perturbation studies were conducted on an industrial cooling tower shown to contain Legionella, using 1-bromo-3-chloro-5,5-dimethylhydantoin (Bromicide, Great Lakes Chemical Corp.). At the manufacturer's recommended concentrations neither the density nor the activity of Legionella was affected. At concentrations greater than 2.0 ppM free residual, the Bromicide was not effective in reducing Legionella to source water concentrations, nor was it effective in reducing the INT activity of the bacterium in situ. The data indicate that at concentrations up to 2.0 ppM, Bromicide is not effective in these tower studies. 23 references, 3 tables.

55071 **(PB—83-217786) Health assessment document for manganese. External review draft.** Erdreich, L.S.; Stara, J.F.; Bruins, R.J.F.; Kello, D. (Environmental Protection Agency, Cincinnati, OH (USA). Office of Environmental Criteria and Assessment). Jun 1983. 348p. (EPA—600/8-83-013A). NTIS, PC A15/MF A01.

The Office of Research and Development of U.S. EPA has prepared this health assessment document for the program office to determine whether manganese should be regulated as a hazardous air pollutant. The document reviews the literature on manganese including general properties, uses, environmental fate and transport, environmental levels and exposure, health effects, carcinogenicity, mutagenicity and teratogenicity. The final chapter reviews the effects of concern and contains a health hazard evaluation, including critical effects and effect levels.

5604 Other Environmental Pollutant Effects

55072 **(PB—83-225375) Microwaves, hyperthermia, and human leukocyte function. Final report, August 1979-June 1982.** Roberts, N.J. Jr.; Lu, S.; Michaelson, S.M. (Rochester Univ., NY (USA)). Jul 1983. 24p. NTIS, PC A02/MF A01.

Studies were performed to determine whether human leukocytes are affected by exposure to microwave energies that equal or even exceed current safety standard recommendations. There were no detectable effects on viability or function of human mononuclear leukocytes resulting from exposure to microwave energy at specific absorption rates up to 4 mW/ml. In contrast to studies in other laboratories, the results were highly reproducible and provided no evidence that current safety standard recommendations are inappropriate insofar as leukocyte function is concerned.

55073 **(PB—83-226480) Immunological and hematological effects of microwave power transmission from a satellite power system (Part 1 and Part 2). Final report.** Chou, C.; Guy, A.W.; Hellstrom, K.E.; Hellstrom, I.; Jones, C.C. (Washington Univ., Seattle (USA). Bioelectromagnetics Research Lab.). [nd]. 54p. NTIS, PC A04/MF A01.

Two systems for exposing mice to 2450 MHz electromagnetic fields are described. The first system was used to expose mice dorsally to circularly polarized electromagnetic fields. The second system was a minature anechoic chamber modified from the original design. Mice were exposed dorsally to far field plane waves in the chamber.

57 HEALTH AND SAFETY

55074 **(MESA-IR—1009) Analysis of accidents related to falls of ground in metal and nonmetal mines, 1972-73.** Seals, E.D.; Speirer, R.A. (Mining Enforcement and Safety Administration, Denver, CO (USA). Health and Safety Analysis Center). 1973. 9p. NTIS, PC A02/MF A01. Order Number DE83902990.

Accidents resulting from falls of ground are among the four most frequent causes of injuries in metal and nonmetal mining. During 1972-73 a total of 33 fatal and 673 disabling injuries resulted from falls of ground at underground metal and nonmetal mines. Lead-zinc mines had the highest percentage of fatalities (33%), followed by copper mines (21%), and gold-silver mines (21%). Copper mines had the highest percentage of disabling injuries (38%), followed by lead-zinc mines (20%), and gold-silver mines (17%). The most frequent cause of accidents resulting from falls of ground is the failure to detect and bar down loose rock. Other primary causes are the use of improper scaling equipment, the failure to install adequate ground support, and the failure to bar down detected loose rock. Approximately 67% of the fatal injuries and 87% of the disabling injuries occurred to victims who, apparently, were totally unaware that they were under loose ground. The accident

data indicates the need for increased emphasis on training stope and face miners to (1) recognize localized rock conditions that tend to produce hazardous ground, (2) use the proper scaling tools and techniques, (3) test the backs, faces, and ribs adequately and repeatedly, and (4) employ more effective ground support at the working faces.

55075 **(MSHA/IR—1126) Injury experience in metallic mineral mining, 1979.** (Mine Safety and Health Administration, Denver, CO (USA). Health and Safety Analysis Center). 1980. 247p. NTIS, PC A11/MF A01. Order Number DE83902955.

Portions are illegible in microfiche products.

This report reviews in detail the occupational injury and illness experience of metallic mineral mining in the United States for 1979. Data reported by operators of mining establishments concerning work injuries are summarized by work location, accident classification, part of body injured, nature of injury, occupation, and principal kind of mineral. Correlative information on employment, worktime, and operating activity also is presented. For ease of correlation with other metal and nonmetallic mineral mining industries and with coal mining, summary reference tabulations are included at the end of the report.

55076 **(MSHA/IR—1130) Laboratory evaluation of RACAL airstream helmet.** Treaftis, H.N.; Tomb, T.F.; Carden, H.F. (Mine Safety and Health Administration, Pittsburgh, PA (USA). Pittsburgh Technical Support Center). 1981. 9p. NTIS, PC A02/MF A01. Order Number DE83903010.

Recently, a new airstream safety helmet designed to provide head, face and respiratory protection in dust-laden environments, has been marketed. Because the helmet offers the potential of providing acceptable personal protection in certain mine operations where technology is not available to reduce dusts to acceptable levels, a laboratory study was conducted to ascertain the feasibility of its use in selected mining operations. The efficiency of the helmet's filtration systems was determined using test aerosols of silica and coal dust ranging in total dust concentration from 9.4 to 175.9 mg/m^3 and 9.5 to 37.6 mg/m^3, respectively. The efficiency of the unit for removing particulates from coal and silica dust aerosols was found to be 100 and 99 percent, respectively. Although the helmet would provide adequate protection from particulates generated during typical coal mining operations, adequate protection may not be provided when used in atmospheres with high silica content.

55077 **(MSHA/IR—1141) Injury experience in sand and gravel mining, 1981.** (Mine Safety and Health Administration, Denver, CO (USA). Health and Safety Analysis Center). 1982. 87p. NTIS, PC A05/MF A01. Order Number DE83902793.

This report reviews in detail the occupational injury and illness experience of sand and gravel mining in the United States for 1981. Data reported by operators of mining establishments concerning work injuries are summarized by work location, accident classification, part of body injured, nature of injury, and occupation. Correlative information on employment, worktime, and operating activity also is presented. For ease of correlation with other metal and nonmetallic mineral mining industries and with coal mining, summary reference tabulations are included at the end of the report.

55078 **(MSHA/IR—1142) Injury experience in metallic mineral mining, 1981.** (Mine Safety and Health Administration, Denver, CO (USA). Health and Safety Analysis Center). 1982. 237p. NTIS, PC A11/MF A01. Order Number DE83903023.

Portions are illegible in microfiche products.

This report reviews in detail the occupational injury and illness experience of metallic mineral mining in the United States for 1981. Data reported by operators of mining establishments concerning work injuries are summarized by work location, accident classification, part of body injured, nature of injury, occupation, and principal kind of mineral. Correlative information on employment, worktime, and operating activity also is presented. For ease of correlation with other metal and nonmetallic mineral mining industries and with coal mining, summary reference tabulations are included at the end of the report.

58 GEOSCIENCES

5801 Geology And Hydrology

REFER ALSO TO CITATION(S) 53645, 53658, 53664, 53665, 53666, 53668, 53669, 53671, 53676, 53683

55079 **(NP—3910802) Utilization of snow-enhancement techniques for acquisition of geological and geo-environmental information from ERTS imagery.** Wobber, F.J.; Martin, K.R. (Earth Satellite Corp., Washington, DC (USA)). Aug 1974. 35p. NTIS, PC A03/MF A01. Order Number DE83910802.

Snow enhancement is the accentuation of various phenomena on the Earth's surface resulting from the differential accumulation or melting of snow cover, or by the greater contrast provided by snow cover in accentuating vegetative or topographic differences. In this manual, emphasis is given to geological applications of snow enhancement; applications for geo-environmental programs are also described. Snow-enhancement techniques effectively extend the working resolution of ERTS imagery and can benefit users of multi-band aircraft imagery as well. Snow-cover in combination with low-angle solar illumination increases the tonal contrast between surface features and is especially useful for the detection of fractures. Low angle solar illumination emphasizes topographic variations which are not as apparent on imagery acquired with a high sun angle. The lowering of solar altitude by several degrees can significantly augment topographic shadowing in the presence of ground snow cover. 9 references.

5802 Geophysics

REFER ALSO TO CITATION(S) 53661, 53680

5803 Mineralogy, Petrology, And Rock Mechanics

REFER ALSO TO CITATION(S) 53659, 53660, 53662, 53663, 53664, 53667, 55228

55080 **(DOE/ER/10762—T1) Effect of strain rate and stress corrosion on the long-term strength of crystalline rocks. Final report.** Martin, R.J. III. (Applied Research Associates, Inc., South Royalton, VT (USA). New England Div.). [nd]. Contract AC02-80ER10762. 18p. NTIS, PC A02/MF A01. Order Number DE83017209.

A key factor in the storage of radioactive waste is the long-term stability of the repository. In order to model the rheological behavior of a site, it is necessary to know the time-dependent deformational characteristics of the rock as well as its fracture strength as a function of time or loading rate. In brittle crystalline rocks, the principal mode or deformation is the opening of and propagation of cracks parallel to the loading axis. In the presence of water or water vapor, crack tips are hydrated; and thus cracks propagate time dependently at stresses well below their theoretical bond strength. The rate of crack propagation is proportional to the water pressure, temperature and applied stress. This stress corrosion cracking gives rise to such time-dependent properties as creep, static fatigue failure and the reduction in strength with decreasing strain rate. A series of experiments were done to determine the effect of pore water pressure, temperature and strain rate on the strength of brittle crystalline rocks. Specifically, granite was tested at an effective confining pressure of 300 bars at strain rates of 2×10^{-7} and 7×10^{-9} sec^{-1} at temperatures of 20°, 100°, and 300°C. The pore pressure was varied between 1 and 1200 bars. For a fixed temperature and strain rate, the fracture strength decreased with increasing pore pressure. Typically increasing the pore pressure from 1 to 1200 bars caused a 7% or so reduction in strength. Increasing temperature and decreasing strain rate also resulted in reducing the failure stress.

55081 **(SAND—83-1148C) Mechanics of fracture under high-rate stress loading.** Grady, D. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 40p. (CONF-830975—3). NTIS, PC A03/MF A01. Order Number DE83013770.

From International union of theoretical and applied mechanics conference on geomaterials: rocks, concretes, soils; Evanston, IL, USA (11 Sep 1983).

The fracture properties of brittle materials subjected to impulsive or high rate loading is considered. Fracture is viewed as a microstructural process through the activation, growth and coalescence of a system of interacting cracks. The loading rate dependence of fracture stress is explained in terms of inertia of isolated cracks. The number of cracks participating in the fracture process, and the number and size of fragments in the failed material are related to both the inherent flaw structure and the rate of energy application required to sustain the system of growing cracks. Differences in loading conditions leading to material failure can result in vastly different fragment size distributions. These differences are compared with physically based statistical laws and possible relations to the loading conditions are explored. Lastly, continuum modelling of dynamic fracture focused toward computational analyses of complex applied problems is covered.

55082 **Temperature calibration of a new rapid quench vessel.** Charles, R.W.; Vidale, R. (Los Alamos Scientific Lab., NM). *American Mineralogist;* 67: 175-179(1982).

A 61 cm long rapid quench vessel of new design has been calibrated for internal temperature gradients at elevated temperature and pressure with a water pressure medium. Calibrations were done over 6.8 cm of the hot end of the vessel at angles of inclination (measured from the horizontal) of -10°, -5°, -2.5°, 0°, +2.5°, +5°, and +10° at temperatures of 300, 450, 600, and 750°C and 2 kbar = P/sub tot/. Results show a water pressure medium is satisfactory at all temperatures if the hot end is raised +5°. A similar set of measurements were performed on a standard 30.5 cm vessel with a filler rod. The results show the temperature gradient to be essentially inclination independent from -10° to +10° although the temperature correction is inclination dependent.

5804 Geochemistry

REFER ALSO TO CITATION(S) 53649, 53663, 53675, 54298, 54914, 54964

55083 **(OEFZS—4200) Dating of lake sediments by determination of the polonium-210 (lead-210) content.** Irlweck, K.; Hedrich, E. (Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H.; Vienna Univ. (Austria)). Mar 1983. 12p. (In German). (ST—105/83). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703433.

At three locations of the lake Neusiedlersee, polonium-210 measurements were carried out in sediment cores to determine the sedimentation rates (S). At core 3 and 4 from the open lake S was not detectable (<= 0.2 mm/year), the ^{210}Po-content was about 0.4 pCi/g sediment. Near by an island in the reed belt (core 5) the sedimentation rate was about S = 2.1 +- 0.2 mm/year. The ^{210}Po-content declined from 2 pCi ^{210}Po/g in the surface layer to 0.4 pCi ^{210}Po/g down to a depth of 20 cm.

5805 Oceanography

REFER ALSO TO CITATION(S) 54951

64 PHYSICS RESEARCH

55084 **(AERE-R—10556) Fundamental physics research at Harwell in the 1950s. 1. The Independent Research Group (Nuclear Physics Division).** Freeman, J.M. (UKAEA Atomic Energy Research Establishment, Harwell. Nuclear Physics Div.). May 1982. 16p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703575.

This paper describes the work during the 1950s of a Group in the Nuclear Physics Division which was particularly free to pursue its own chosen lines of research. The academic achievements and the spin-off in practical terms which derived from this Group are discussed, with some assessments of their value to Harwell and the British scientific community. The topics covered include the exploitation of proportional counters for low energy X- and γ-ray spectroscopy, mesonic atoms, and ionization energy loss; cosmic-ray showers; Cherenkov radiation; transition radiation; and fission physics.

6401 Astrophysics And Cosmology

REFER ALSO TO CITATION(S) 54646, 54653, 54654

55085 **(AD-A—126397/9) Absorption of energetic protons by Saturn's ring g. Progress report for FY83.** Van Allen, J.A. (Iowa Univ., Iowa City (USA). Dept. of Physics and Astronomy). Mar 1983. 38p. NTIS, PC A03/MF A01.

In a preliminary paper on Pioneer 11 observations of energetic particles in Saturn's inner magnetosphere, Van Allen et al. 1980a reported a distinctive absorption feature at a radial distance r approximately 2.82 R(s). (1 R(s) = Saturn's equatorial radius = 60,000 km.) This feature was accurately the same in form, magnitude, and radial position on inbound and outbound segments of the encounter trajectory; the lapse of time between the two traversals of the feature was 3.9 hours and the difference in planetocentric inertial longitudes was 178 degrees. It was labeled 1979 S3 and identified in the text as provisional evidence for a heretofore unknown satellite. In the summary table of that preliminary report it was designated as a satellite with the qualifying remark: 'suspected (to be the absorption signature of a satellite) but interpretation of the signature is ambiguous'. During the subsequent Saturn encounter of Voyager 1, an image was obtained of a segment of what appeared to be a faint, narrow ring of particulate matter at a radial distance of approximately 170,000 (2.83 Rs). The subsequent discussion assumes that such a ring of particulate matter is the cause of the absorption feature observed by Pioneer 11 at r approximately 2.82 Rs. A restudy has been made of Pioneer 11 data on the distribution of energetic protons Ep > 80 MeV in Saturn's inner magnetosphere.

55086 **(AD-A—126931/5) Dynamical phenomena in sunspots. Final report 1 Mar-31 Jul 82.** Nye, A.H. (Rochester Univ., NY (USA). Dept. of Mechanical Engineering). 29 Oct 1982. 26p. NTIS, PC A03/MF A01.

Observations were taken of a sunspot on August 18 and 21, 1980 with high spatial and temporal resolution, in spectral lines formed in the photosphere and chromosphere. The data has been reduced and the results of the analysis are given in this report. A typical moving magnetic feature (MMF) was observed in velocity, intensity, and magnetic field. New information included an observed downflow of 400m/s centered in the feature. The lifetime of the MMF is dependent on the type of observation and needs to be defined clearly. The umbral flashes and umbral oscillations are the same feature with different amplitudes. The flash seems due to saturation of the film. With high resolution it is shown that the umbral oscillations exhibit a characteristic Z pattern when the Calcium II H profiles is plotted in a time series. Five-minute oscillations were clearly detected in the sunspot photosphere. They are the passive response of the umbra to the global p-mode oscillations of the quiet photosphere. The particular modes observed depend on the geometry of the sunspot at different depths. The observations can be used as a probe of sunspot structure below the visible surface.

55087 **(AD-A—127032/1) Studies of solar flares and erupting filaments. Final report 1 Jul 76-30 Sep 81.** Martin, S.F. (California State Univ., Northridge (USA); San Fernando Observatory, Sylmar, CA (USA)). Sep 1981. 35p. NTIS, PC A03/MF A01.

Our research on solar flares and erupting filaments lead to the development of a formula for forecasting the eruption of quiescent filaments under the circumstance of the birth of a new active region within 30 heliographic degrees of the filament. Parmeters that were studied and found not to be significantly correlated with the eruption of filaments were distance, up to 30 heliographic degress, between the new regions and the filaments, the relative orientations of the magnetic field of the new Filament length was correlated with filament eruption but was found to be a factor dependent

upon the total flux of the photospheric magnetic fields related to, supporting, or containing the filaments. No evidence was found in x-ray images to either confirm or negate our hypothesis that the eruption of quiescent filaments is triggered by fields adjacent to the filaments.

55088 **(AD-A—127122/0) Quantitative study of magnetic flux transport on the sun.** Sheeley, N.R. Jr; Boris, J.P.; Young, T.R. Jr; DeVore, C.R.; Harvey, K.L. (Naval Research Lab., Washington, DC (USA). E.O. Hulburt Center for Space Research; Berkeley Research Associates, Springfield, VA (USA); Solar Physics Research Corp., Tucson, AZ (USA)). 15 Feb 1983. 8p. NTIS, PC A02/MF A01.

A computational model, based on diffusion, differential rotation, and meridional flow, has been developed to simulate the transport of magnetic flux on the Sun. Using Kitt Peak magnetograms as input, as have determined a best-fit diffusion constant by comparing the computed and observed fields at later times. This paper presents the initial results of a project to simulate the transport of solar magnetic flux using diffusion, differential rotation, and meridional flow. The study concerns the evolution of large-scale fields on a time scale of weeks or years, and ignores the rapid changes that accompany the emergence of new magnetic regions and the day-to-day changes of the supergranular network itself.

55089 **(AD-A—129842/1) Electric fields in earth orbital space. Annual report.** Olson, W.P.; Pfitzer, K.A. (McDonnell Douglas Astronautics Co., Huntington Beach, CA (USA)). May 1983. 64p. (MDC-H—0731). NTIS, PC A04/MF A01.

Work accomplished during the past year is reported. We have determined conclusively that a fraction of the magnetosheath plasma routinely has access to the magnetosphere. This entry occurs preferentially along the flanks of the tail and on the polar side of the dayside cusp regions. This entry occurs in the steady state and is responsible for the maintenance of several current state magnetic features. We have continued our involvement with the magnetospheric CDAWS, and have now constructed event models of the magnetic and electric fields for 3 epochs. Our magnetic field models adequately represent the magnetic field over the dayside magnetosphere. However, near midnight at geosynchronous orbit and in the near tail region, there is a large discrepancy between observation and model predictions. We believe that this is caused by the current neglect in the models of the closure of the Birkeland Region 2 currents in the vicinity of the inner edge of the plasma sheet. We have also developed procedures for the mapping of electric fields along magnetic field lines when time varying magnetic fields (and an induced component of the electric field) are present. These procedures are being tested with STARE and GEOS-2 data.

55090 **(AD-A—129873/6) Ion cyclotron waves in the Io plasma torus: polarization reversal of whistler mode noise. Revision. Progess report.** Gurnett, D.A.; Goertz, C.K. (Iowa Univ., Iowa City (USA). Dept. of Physics and Astronomy). 10 May 1983. 28p. NTIS, PC A03/MF A01.

Because of the presence of multiple ion species in the Io plasma torus whistler mode noise can be converted to ion cyclotron waves via a polarization reversal process at the local crossover frequency. Using whistler mode intensity measurements in the Jovian magnetosphere from Voyager 1 we estimate the pitch-angle diffusion rates that would occur if the noise is converted to ion cyclotron waves. Typical pitch-angle diffusion coefficients range from D sub alpha alpha approx. = 1/1000000 sec for protons resonating near the equator to D sub alpha alpha approx = 1/10000 sec for 10 keV 0(+) ions resonating at high latitudes. Although complete bounce averaged diffusion coefficients have not yet been computed, preliminary estimates indicate that the energetic ion precipitation caused by these wave may be able to account for the EUV auroral emissions at the foot of the torus field lines.

55091 **(AD-A—129921/3) Chorus-related electrostatic bursts at Jupiter and Saturn. Progress report.** Reinleitner, L.A.; Kurth, W.S.; Gurnett, D.A. (Iowa Univ., Iowa City (USA). Dept. of Physics and Astronomy). 18 May 1983. 42p. NTIS, PC A03/MF A01.

Analyses of the wideband plasma wave data obtained by Voyagers 1 and 2 at Jupiter and Saturn have revealed electrostatic bursts similar to those recently discovered at Earth in association with whistler-mode chorus. In all three magnetospheres the bursts are characterized by sporadic emissions near or slightly below the electron plasma frequency with bandwidths ranging from 10% to more than 50% of the center frequency. The events found at Jupiter occur in the middle magnetosphere during both the dayside as well as the early morning passes. At Saturn, the bursts occurred in the outer regions of the magnetosphere during the dayside pass. In each of the events analyzed, evidence exists for modulation of the electrostatic bursts by a low frequency wave, presumably chorus. One of the observations gained at Jupiter includes the detection of a low-frequency band at the proper frequency for chorus. Detailed waveform analysis confirms that this band does, indeed, modulate the electrostatic bursts. Based on the present understanding of the terrestrial observations it is believed that the electrostatic bursts are generated by an electron beam trapped in Landau resonance with the chorus.

55092 **(AD-A—130115/9) Magnetohydrodynamic modelling of interplanetary disturbances between the sun and earth. Environmental research papers.** Dryer, M.; Wu, S.T. (Air Force Geophysics Lab., Hanscom AFB, MA (USA)). 21 Dec 1982. 50p. (AFGL-TR—82-0396; AFGL-ERP—816). NTIS, PC A03/MF A01.

A time-dependent, nonplanar, two-dimensional (2-D) magnetohydrodynamic computer simulation model is used to simulate a series of solar flare-generated shock waves and their subsequent disturbances in interplanetary space between the sun and the earth's magnetosphere. The canonical or anzatz series of shock waves include initial velocities near the sun over the range 500 to 3000 km/sec. The ambient solar wind, through which the shocks propagate, is taken to be a steady-state flow that is independent of heliolongitude; its radial dependency consists of a representative set of plasma and magnetic field parameters which will be presented. Particular attention is directed to the MHD model's ability to address fundamental operational questions regarding the long-range forecasting of geomagnetic disturbances. These questions are: (1) will a disturbance (such as the present canonical series of solar flare shock waves) produce a magnetospheric and ionospheric disturbance, and, if so; (2) when will it start; (3) how severe will it be; and (4) how long will it last. The model's output is used to compute various solar wind indices of current interest for this purpose. It is concluded that future work should be focused on a cohesive updating of, for example, daily measured solar parameters as input for the model whose output should be compared with spacecraft data for specific events.

55093 (ANL-HEP-CP—82-24, pp 416-420) **Proposed geological solar neutrino flux measurement.** Cowan, G.A.; Haxton, W.C. (Los Alamos National Lab., NM). 1982. NTIS, PC A21/MF A01. (CONF-8206123—).

From Workshop on proton decay experiments; Argonne, IL, USA (7 Jun 1982).

Of a number of possible hypotheses for explaining the present solar neutrino flux discrepancy, two are presently receiving particular consideration. The first is that neutrinos oscillate or decay. A sensitive test of this possibility is expected to emerge from the proposed ^{71}Ga - ^{71}Ge experiment. The second hypothesis is that the standard solar model requires some modification. In this connection, a particularly interesting possibility, suggested by Dilke and Gough, is that an overstability causes the sun's core to mix every few hundred million years. This would lead to a temporary reduction in solar luminosity, a terrestrial ice age of about 2 million years duration, an a somewhat longer depression in the neutrino flux, particularly the high energy ^{8}B component. As the Pleistocene Epoch began about 3 million years ago, we may be living in such a special time. A geochemical experiment based on measurement of a product which is proportional to the ^{8}B neutrino flux integrated over a period of several million years can provide a test of this hypothesis. We propose to measure the concentration of ^{98}Tc (tau 1/2 = 4.2 million years) made by neutrino capture in a molybdenum ore deposit. A second product, ^{97}Tc (tau 1/2 = 2.6 million years) will also be measured but will probably be masked by an unacceptably high background. If the neutrino instability hypothesis is supported by the ^{71}Ge result, the ^{98}Tc measurement would be expected to provide a flux value supplementing the present ^{37}Cl -

^{37}Ar result. If, on the other hand, an extended cyclical depression in solar output has occurred, the ^{99}Tc measurement is expected to provide unique information concerning the long term value of the neutrino flux.

55094 **(LA-UR—83-2368) Microprobe analyses of rare-earth-element fractionation in meteoritic minerals.** Benjamin, T.M.; Duffy, C.J.; Rogers, P.S.Z.; Maggiore, C.J.; Woolum, D.S.; Burnett, D.S.; Murrell, M.T. (Los Alamos National Lab., NM (USA); California State Univ., Fullerton (USA); California Inst. of Tech., Pasadena (USA)). 1983. Contract W-7405-ENG-36. 18p. (CONF-830772—6). NTIS, PC A02/MF A01. Order Number DE83017326.

From 3. international conference on particle-induced X-ray emission (PIXE) and its analytical applications; Heidelberg, F.R. Germany (18 Jul 1983).

Two meteorites were analyzed by PIXE with the Los Alamos Nuclear Microprobe. The enstatite achondrite Pena Blanca Spring and the ordinary chondrite St. Severin were chosen as likely candidates for use in ^{244}Pu (t/sub 1/2/ = 82 my) cosmochronology and geochronology. These applications require the meteoritic minerals to have unfractionated actinides and lanthanides relative to cosmic elemental abundance ratios. The PIXE analyses produced evidence of actinide-lanthanide fractionation in Pena Blanca Spring oldhamite (CaS) whereas the St Severin phosphates, whitlockite and chlorapatite, do not exhibit this fractionation.

55095 **(LA-UR—83-2486) Nuclear physics problems for accreting neutron stars.** Wallace, R.K.; Woosley, S.E. (Los Alamos National Lab., NM (USA); California Univ., Santa Cruz (USA)). 1983. Contract W-7405-ENG-36. 7p. (CONF-830797—1). NTIS, PC A02/MF A01. Order Number DE83017297.

From Workshop on high energy transients; Santa Cruz, CA, USA (11 Jul 1983).

Portions are illegible in microfiche products.

The importance of p(e$^-$ nu)n and of (p,γ) reactions on ^{56}Ni during a thermonuclear runaway on a neutron star surface is pointed out. A fast 16-isotope approximate nuclear reaction network is developed that is suitable for use in hydrodynamic calculations of such events.

55096 **(PB—83-186163) Studies of solar Ca K plages and UV, X-ray and 10 cm variations. Technical memo.** Puga, L.C.; Donnelly, R.F. (National Oceanic and Atmospheric Administration, Boulder, CO (USA). Space Environment Lab.). Sep 1982. 47p. (NOAA-TM-ERL-SEL—65). NTIS, PC A03/MF A01.

The literature about Ca K plages is briefly reviewed with particular emphasis on the statistics of plage lifetimes, areas, and intensities. Inconsistencies among reports of Ca K plage data were examined and occasional problems found. Plage area is shown to be correlated to the associated sunspot area but the relation includes appreciable scatter. Estimates of the solar 1-8A X-ray flux based on Ca K plage data are shown to be more accurate than those based on the 10.7 cm radio flux. Daily means of the solar soft X-ray flux observed primarily from the SMS-2 satellites are presented for 1975-1976. The quality factor for solar soft X-ray data are presented for 1975-1980.

6402 Atmospheric Physics

55097 **(AD-A—129320/8) Plasma wave turbulence and particle heating caused by electron beams, radiation, and pinches. Annual interim report 1 Oct 81-30 Sep 82.** Goldman, M.V. (Colorado Univ., Boulder (USA). Dept. of Astro-Geophysics). 1 Jan 1983. 276p. (CU—1533201). NTIS, PC A13/MF A01.

This report covers research performed from 1 Oct 81 through 30 Sep 82 on electron beam excited plasma turbulence and electromagnetic emission, on propagation of intense electromagnetic radiation in the earth's ionosphere, and on laboratory experiments on particle beams and plasma waves.

55098 **(AD-A—129922/1) Electron acceleration by Landau resonance with whistler mode wave packets. Progress report.** Gurnett, D.A.; Reinleitner, L.A. (Iowa Univ., Iowa City (USA). Dept. of Physics and Astronomy). 10 May 1983. 28p. NTIS, PC A03/MF A01.

Recent observations of electrostatic waves associated with whistler mode chorus emissions provide evidence that electrons are being trapped by Landau resonance interactions with the chorus. In this paper we discuss the trapping, acceleration and escape of electrons in Landau resonance with a whistler mode wave packet. We show that acceleration can occur by both inhomogeneous and dispersive effects. The maximum energy gained is controlled by the points where trapping and escape occur. Large energy changes are possible if the frequency of the wave packet or the magnetic field strength increase between the trapping and escape points. Various trapping and escape mechanisms are discussed.

55099 **(AD-A—130116/7) Electron beam-induced electromagnetic waves in a magnetospheric plasma. Technical report.** Donatelli, D.E.; Chang, T.S. (Boston Coll., Chestnut Hill, MA (USA). Dept. of Physics). 15 May 1983. 22p. (SCIENTIFIC—1). NTIS, PC A02/MF A01.

A theoretical interpretation of waves detected by the SCATHA satellite near geostationary altitude during electron beam operations is presented. The observations consist of emission bands at or between harmonics of the electron gyrofrequency, combining background and beam-induced emissions. Beam-induced emissions often broaden and/or intensify the emission band. A magnetic field component is detected along with the electric field component for most of the emissions. Therefore, these emissions are assumed to be electromagnetic waves. The linearized Vlasov equation is used to derive the dispersion relation for electromagnetic waves in a warm, homogeneous, uniformly magnetized plasma. The ambient plasma is represented as a Maxwellian distribution and the electrom beam as a delta-function in velocity space. The dispersion relations is solved analytically for non-resonant, perpendicularly propagating, electromagnetic waves. Using observational data to quantitatively define the plasma parameters, unstable solutions are found at frequencies consistent with those of the observed emissions.

55100 **(AD-A—130135/7) Project to develop an index of pc 3,4,5 geomagnetic pulsations and to study their control by solar wind parameters. Final report.** Greenstadt, E.W. (TRW Defense and Space Systems Group, Redondo Beach, CA (USA). Space Sciences Dept.). Apr 1983. 83p. (TRW—36116-6006-UT-00). NTIS MF A01.

This report summarizes the recent activities and results of a study seeking to discover and quantify the relationship between solar wind parameters, magnetosheath turbulence, and daytime geomagnetic pulsations. The most significant achievement has been a major advance in data processing and computational analysis leading to the first observations and measurements of magnetospheric resonance thickness, wave transfer across the magnetopause, and wave structure in the outer magnetosheath.

55101 **(IC—82/201) Interaction between ionization and gravity waves in the upper atmosphere.** Balcioglu, O. (International Centre for Theoretical Physics, Trieste (Italy)). Oct 1982. 16p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703435.

It is known that travelling ionospheric disturbances are produced by gravity waves. During their movement from the F region downwards to the E region, gravity waves can produce thin layers called transients on ionograms and, if the wave motion persists, 'h-type Esub(S) can be produced. To investigate the problem, the continuity equations for both the E and F regions are solved for a perturbation, the motion of which is taken to be a gravity wave. Hitherto, N'/N_0, the ratio of the disturbed to the undisturbed electron density, has been calculated by using only the Hall conductivity and ignoring the diffusion term for the F region. In the present calculations we have used Pedersan and Hall conductivities and calculated the N'/N_0 ratio for both the E and F regions. Using CIRA standard atmosphere data we find for the F region that N' can exceed N_0 by up to 4 percent, depending on the horizontal wind velocity. In the E region, N' reaches much higher values than in

the F region. Thus at 120 km if we take a typical horizontal wind velocity of 80 m/sec (wavelength 150 km), N' is about twice as large as N_0. From these results we see that the diffusion term is important for the E region.

6403 Atomic, Molecular, And Chemical Physics

REFER ALSO TO CITATION(S) 54269, 55206

55102 **(AD-A—126461/3) Investigation of impurity concentrations and electrical properties near interfaces. Final report 1 Feb 81-31 Aug 82.** Wittry, D.B. (University of Southern California, Los Angeles (USA). Dept. of Materials Science). 27 Dec 1982. 18p. NTIS, PC A02/MF A01.

Studies of the nature of the thermal conversion on semi-insulating GaAs:Cr using photoluminescence, cathodoluminescence, and secondary ion mass spectrometry are described. Improvements in a quadrupole mass spectrometer instrument for secondary ion mass spectrometry are described and the applications of this instrument to significant problems in solid state electronics are discussed.

55103 **(AD-A—129758/9) Dielectronic recombination rates, ionization equilibrium, and radiative emission rates for MN ions in low-density high-temperature plasmas. Memorandum report.** Jacobs, V.L.; Davis, J. (Naval Research Lab., Washington, DC (USA)). 23 Jun 1983. 21p. (NRL-MR—5105). NTIS, PC A02/MF A01.

The analysis of optically-thin far-ultraviolet and x-ray emission lines of multiply-charged ions is one of the basic methods for determining the temperatures and densities of laboratory and astrophysical plasmas. In addition, the energy balance in these plasmas can be significantly influenced by the emission of radiation from relatively low concentrations of multiple-charged atomic ions. Because the populations of the excited levels are expected to depart substantially from their local thermodynamic equilibrium values a detailed treatment of the elementary collisional and radiative processes must be employed in order to predict the emission line intensities. In this investigation the authors present the results of calculations based on a corona equilibrium model in which a detailed evaluation is made of the dielectronic recombination rate coefficients. The ionization and autoionization following inner-shell electron excitation from each ground state are balanced by direct radiative and dielectronic recombination. The spectral line intensities emitted by the low-lying excited states, which are assumed to undergo spontaneous radiative decay in times that are short compared with the collision time, are evaluated in terms of the corona ionization equilibrium distributions of the ground states and their electron-impact excitation states.

55104 **(AD-A—129832/2) Theoretical studies of kinetic mechanisms of negative ion formation in plasmas. Final technical report 15 Jan 81-15 Jan 83.** Michels, H.H.; Hobbs, R.H. (United Technologies Research Center, East Hartford, CT (USA)). Mar 1983. 30p. (UTRC/R—83-925499). NTIS, PC A03/MF A01.

This technical program constitutes a theoretical research investigation of the kinetic mechanisms of negative ion formation in plasmas. This study was directed toward elucidating the mechanisms of the most important volume-dependent reactions that occur in hydrogen-ion, H-(D-), source devices, primarily of the Belchenko-Dimov-Dudnikov (BDD) type. The primary goal of this research program was to identify the most important reactions leading to H-(D-) production or destruction and to estimate these reaction rates as function of system parameters such as density, composition and temperature. A further goal was to explore new chemical sources for the production of light mass negative atomic ions. The results of this program furnish data and provide direction for more detailed investigations into the kinetics of both gas phase and gas-surface reaction rates of importance in ion source devices and provide input for reliable modeling of such systems. This investigation was carried out using quantum mechanical methods. both ab initio and density functional approaches were employed in these studies.

55105 **(BNL—33472) Interferenceeffects in the quasimolecularen K-radiation induced in collisions of hydrogen-like ions.** Schuch, R.; Schmidt-Boecking, H.; Tserruya, I.; Hoffmann, R.; Johnson, B.M.; Jones, K.W.; Meron, M.; Barette, J.; Ingwersen, H.; Justiniano, E. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.); Frankfurt Univ. (Germany, F.R.). Inst. fuer Kernphysik; Weizmann Inst. of Science, Rehovoth (Israel); Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 4p. (In German). (CONF-8304120—1). NTIS, PC A02/MF A01. Order Number DE83017345.

From Atomic physics workshop; Obserstdorf, F.R. Germany (1 Apr 1983).

Portions are illegible in microfiche products.

The impact-parameter-dependent emission probabilities of quasimolecular x-rays were measured in collisions of 5, 10, and 20 MeV Cl^{16+} on Ar and 16 MeV S^{16+} on Ar. The coincident energy spectra of the quasimolecular K radiation show a clear impact-parameter-dependent structure which is in good agreement with calculations taking into account the interference of ls σ decay amplitudes on the incoming and outgoing halves of the trajectory.

55106 **(BNL—33534) Intense positron beams and possible experiments.** Lynn, K.G.; Frieze, W.E. (Brookhaven National Lab., Upton, NY (USA)). Jul 1983. Contract AC02-76CH00016. 17p. (CONF-830770—3). NTIS, PC A02/MF A01. Order Number DE83017580.

From NATO advanced research workshop on positron scattering in gases; London, UK (19 Jul 1983).

In this paper, we survey some of the ideas that have been proposed regarding the production of intense beams of low energy positrons. Various facilities to produce beams of this type are already under design or construction and other methods beyond those in use have been previously discussed. Moreover, a variety of potential experiments utilizing intense positron beams have been suggested. It is to be hoped that this paper can serve as a useful summary of some of the current ideas, as well as a stimulation for new ideas to be forthcoming at the workshop. 31 references.

55107 **(CONF-830390—1) Atomic-orbital expansion model for describing ion-atom collisions at intermediate and low energies.** Lin, C.D.; Fritsch, W. (Kansas State Univ., Manhattan (USA); Hahn-Meitner-Institut fuer Kernforschung Berlin G.m.b.H. (Germany, F.R.)). 1983. Contract AC02-79ER10514. 3p. NTIS, PC A02/MF A01. Order Number DE83017553.

From US/Japanese cooperative seminar; Honolulu, HI, USA (14 Mar 1983).

In the description of inelastic processes in ion-atom collisions at moderate energies, the semiclassical close-coupling method is well established as the standard method. Ever since the pioneering work on $H^+ + H$ in the early 60's, the standard procedure is to expand the electronic wavefunction in terms of molecular orbitals (MO) or atomic orbitals (AO) for describing collisions at, respectively, low or intermediate velocities. It has been recognized since early days that traveling orbitals are needed in the expansions in order to represent the asymptotic states in the collisions correctly. While the adoption of such traveling orbitals presents no conceptual difficulties for expansions using atomic orbitals, the situation for molecular orbitals is less clear. In recent years, various forms of traveling MO's have been proposed, but conflicting results for several well-studied systems have been reported.

55108 **(CONF-830936—2) 100% alignment of hydrogen excited states in beam-foil spectroscopy.** Berry, H.G.; Neek, D.; Somerville, L.P.; Hardis, J. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 2p. NTIS, PC A02/MF A01. Order Number DE83017963.

From Symposium on atomic spectroscopy (SAS-83); Berkeley, CA, USA (12 Sep 1983).

We have measured the relative population production of high n-states in hydrogen following electron capture by fast protons of 50 to 100 keV energy in beam-foil collisions. We observed the photon-emission from high n-states of the Balmer series (up to n = 15).

55109 (CONF-8308108—1) Isotope dependence of the breakdown strength of gases. Christophorou, L.G.; Mathis, R.A.; James, D.R. (Oak Ridge National Lab., TN (USA)). 1983. Contract W-7405-ENG-26. 3p. NTIS, PC A02/MF A01. Order Number DE83017272.

From 16. international conference on phenomena in ionized gases; Duesseldorft, F.R. Germany (29 Aug 1983).

Portions are illegible in microfiche products.

It has been found that while the highly nonuniform direct current breakdown voltages, V/sub s/, of H_2 and NH_3 exceed, respectively, those of D_2 and ND_3, the V/sub s/ of CH_4 is substantially lower than that of CD_4. The former (direct) isotope effect may be attributed to the higher ionization coefficients for the deuterated species compared with the nondeuterated, and the latter (inverse) isotope effect may result from differences in the electron-impact-induced dissociation processes of the isotopic pairs of molecules.

55110 (CONF-8308112—2) Electron-molecule interactions in gases and liquids: the electron-attachment process in gases and nonpolar liquids. Christophorou, L.G.; Siomos, K. (Oak Ridge National Lab., TN (USA)). 1983. Contract W-7405-ENG-26. 13p. NTIS, PC A02/MF A01. Order Number DE83017205.

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

Efforts have recently been made to relate knowledge on electron-molecule interactions in gases to that on similar processes in liquids. In addition, interphase studies of electron-molecule interactions have been initiated also to study the effects of density and nature of a medium on the isolated-molecule properties and interactions in the intermediate density range between a low-pressure gas and the condensed phase. In this paper we discuss briefly the nature of electron attachment processes in nonpolar liquids, the effect of the attaching gas molecule itself and the electron state on the attachment rate constant, and the relation of electron attachment processes in nonpolar liquids to those in gases.

55111 (DOE/ER/04426—6) Kinetics of elementary atom and radical reactions. Progress report. Gordon, R.J. (Illinois Univ., Chicago (USA)). 1 Aug 1983. Contract AC02-77ER04426. 12p. NTIS, PC A02/MF A01. Order Number DE83017677.

Two studies are reported: reactions of oxygen atoms with hydrogen molecules, and vibrational relaxation of highly excited molecules (SF_6 to N_2O). (DLC)

55112 (DOE/ER/10830—2) Role of d-electrons in chemisorption and metal/support interactions studied by electron spectroscopy. Progress report, January 15, 1983-January 14, 1984. Henrich, V.E. (Yale Univ., New Haven, CT (USA). Dept. of Physics). Sep 1983. Contract AC02-81ER10830. 26p. NTIS, PC A03/MF A01. Order Number DE83017564.

This research program is an investigation of the nature of the strong metal-support interaction (SMSI) between Rh metal catalysts and TiO_2 supports by using a variety of surface-sensitive electron-spectroscopic techniques to characterize the properties of model catalysts consisting of small Rh particles supported on single-crystal TiO_2. Since the writing of the previous Annual Progress Report (DOE/ER/10830-1) we have further characterized the changes in the electronic structure of the surface cations of the support as a function of thermal processing, and we have also simulated with our model catalysts the processing that transforms catalysts to an SMSI state. Evidence has been found for the migration of a sub-oxide of Ti over the Rh particles during high temperature reduction, thus blocking the Rh sites for chemisorption. We are currently extending that work to high temperature oxidation of model catalysts followed by low temperature reduction in order to establish the reversibility of the SMSI transition. The electronic structure of the core levels of both the catalyst atoms and the ions of the support is being studied in order to determine the changes in oxidation state that accompany SMSI. We have also re-evaluated the theoretical work of Horsley on the charge transfer model of SMSI and shown that his results are irrelevant to the interaction of metal atoms with actual TiO_2 surfaces. The correct way to approach the problem of reduced TiO_2 surfaces has been described.

55113 (DOE/ER/70038—5) Thermal-energy scattering of atoms in high Rydberg states. Final report. Kocher, C.A. (Oregon State Univ., Corvallis (USA). Dept. of Physics). 12 Aug 1983. Contract AT06-76ER70038. 12p. NTIS, PC A02/MF A01. Order Number DE83017110.

This research consists of an experimental study of the scattering of free atoms in high Rydberg states and their interaction with ground-state atomic and molecular targets. The highly excited Rydberg states, lying just below the ionization limit, describe a single weakly bound electron moving around a positive ion core. These states are characterized by large principal quantum numbers, long radiative lifetimes, and large cross sections for certain scattering processes. In these investigations, differential cross sections have been measured for the deflection of high Rydberg atoms from an atomic beam. Our results show that the cross sections are virtually independent of the principal quantum number and in good agreement with calculations for deflection of the core ion alone. If the momentum transfer takes place as an essentially free-ion process, then it is possible to obtain ion scattering cross sections from measurements with Rydberg atoms as projectiles. The presence of a distant valence electron provides a charge-neutralizing sheath surrounding the core ion, rendering its trajectory virtually unaffected by non-ionizing external fields.

55114 (DOE/EV/03861—48) Photoemission yields of liquids in the vacuum ultraviolet. Painter, L.R.; Hubbell, H.H. Jr.; Birkhoff, R.D. (Tennessee Univ., Knoxville (USA). Dept. of Physics and Astronomy; Science Applications, Inc., Oak Ridge, TN (USA); Science Applications, Inc., La Jolla, CA (USA)). 1983. Contract AS05-76EV03861. 3p. (CONF-830710—9). NTIS, PC A02/MF A01. Order Number DE83017395.

From 7. international conference of radiation research; Amsterdam, Netherlands (3 Jul 1983).

A plethora of studies have been devoted to the phenomenon of photoemission from solid surfaces. These studies have been extremely useful in revealing details of electronic structure for many metals, semiconductors and insulators. However, similar studies exist for only a few liquids. Prior to our measurements no data was available for the liquid state in the energy region beyond 10 eV where collective oscillations can be excited. A number of insulating liquids of biological interest have been studied to 25 eV using optical techniques. All have been shown to have broad maxima in the energy loss function at about 21 eV. Although optical data indicates that plasma oscillations should occur, it does not provide direct observation of their existence, for photons cannot directly stimulate plasmons. Absolute photoemission yield measurements provide a more direct indication of the existence and magnitude of this important mode of energy deposition in liquid. An adaptation of the double-ion chamber method originated by Samson has been used to measure the incident beam intensity and the reflectance from a liquid surface in equilibrium with its vapor. In this photoionization method, the ionization in the vapor resulting from this absorption is used to monitor the beam strength before and after reflection. Reflectance, transmittance, and photoemission of liquids in the vacuum ultraviolet spectral region are analyzed to yield the optical and dielectric functions, the absolute photoemission, and the electron mean free paths in the liquid as functions of energy.

55115 (JINR—R-10-82-304) Data compression methods in problems of experimental nuclear physics. Byalko, A.A.; Volkov, N.G.; Tsupko-Sitnikov, V.M. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1982. 16p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703097.

The analysis and classification of the data compression methods, used in nuclear physics, based on the techniques for evaluation of information (classical-given by Shennon, or algorithmic-given by A. N. Kolmogorov) are presented. imong three suggested classification categories of the methods: a) ones based on the use of statistical relations; b) ones using elements of data processing and c) ones based on orthogonal transformations-the most effective are the last two. The methods using algorithms with transformation basis, determined by the data, are especially promissing. These methods have high compression degree and at the same time permit to conserve information very close to initial.

55116 **(LA-UR—83-2319) Selective laser ionization for mass-spectral isotopic analysis.** Miller, C.M.; Nogar, N.S.; Downey, S.W. (Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. 6p. (CONF-8308114—1). NTIS, PC A02/MF A01. Order Number DE83017303.

From Laser-based ultrasensitive spectroscopy and detection V conference; San Diego, CA, USA (23 Aug 1983).

Resonant enhancement of the ionization process can provide a high degree of elemental selectivity, thus eliminating or drastically reducing the interference problem. In addition, extension of this method to isotopically selective ionization has the potential for greatly increasing the range of isotope ratios that can be determined experimentally. This gain can be realized by reducing or eliminating the tailing of the signal from the high-abundance isotope into that of the low-abundance isotope, augmenting the dispersion of the mass spectrometer. We briefly discuss the hardware and techniques used in both our pulsed and cw RIMS experiments. Results are presented for both cw ionization experiments on Lu/Yb mixtures, and spectroscopic studies of multicolor RIMS of Tc. Lastly, we discuss practical limits of cw RIMS analysis in terms of detection limits and measurable isotope ratios.

55117 **Pulsed neutrons: One year of experience with the new source at Argonne National Laboratory.** Lander, G.H. (Argonne National Lab., IL (USA)). *Physica B+C (Amsterdam);* **120**: No. 1-3, 15-24(May 1983). (CONF-8208155—).

From Yamada conference on neutron scattering in condensed matter; Hakone, Japan (31 Aug 1982).

The Intense Pulsed Neutron Source (IPNS) at Argonne National Laboratory is a spallation neutron source based on a 500 MeV proton accelerator operating at 30 Hz and with an average proton current of proportional10 μA. Neutron scattering instruments for elastic scattering include two powder diffractometers, a single-crystal diffractometer based on the Laue method and employing a large (30x30 cm) position-sensitive scintillation detector, a small-angle diffractometer using a position-sensitive detector, and a polarized-neutron diffractometer which will utilize the spin-refrigerator device to obtain a beam of white polarized neutrons. For inelastic scattering we presently have the crystal-analyzer spectrometer, and two chopper spectrometers capable of providing monoenergetic incident neutron beams of between 100 and 600 meV. From its inception IPNS has been operating in a user mode and the selection of experiments is made by a Program Committee twice a year on the basis of the scientific merit of submitted proposals.

55118 **Condensed matter research at the Los Alamos pulsed neutron source (WNR).** Eckert, J. (Los Alamos National Lab., NM (USA)). *Physica B+C (Amsterdam);* **120**: No. 1-3, 25-30(May 1983). (CONF-8208155—).

From Yamada conference on neutron scattering in condensed matter; Hakone, Japan (31 Aug 1982).

Also published as conference report: CA-UR--82-2190; CONF-820935-1, 1982.

The experimental program at the WNR in condensed matter research at present is aimed principally at utilizing the high epithermal neutron flux available at a spallation neutron source. Interesting new results have been obtained in several areas including hydrogen vibrations in metals, chemical vibrational spectroscopy and the structure of liquids. For example, extensive vibrational spectra were obtained by hydrogen in Nb which could be described in terms of a three-dimensional localized anharmonic oscillator, deuterium substitution methods were used to determine the variation with 0-0 distance of the hydrogen bending mode frequency in extremely short intramolecular hydrogen bonds, and model-independent partial structure factors were determined for liquid water.

55119 **Low-pressure ion source.** Bacon, F.M.; Brainard, J.P.; O'Hagan, J.B.; Walko, R.J. US Patent Application 6-437,081. 27 Oct 1982. 25p. Contract AC04-76DP00789.

A low pressure ion source for a neutron source comprises a filament cathode and an anode ring. Approximately 150V is applied between the cathode and the anode. Other electrodes, including a heat shield, a reflector and an aperture plate with a focus electrode, are placed at intermediate potentials. Electrons from the filament drawn out by the plasma and eventually removed by the anode are contained in a magnetic field created by a magnet ring. Ions are formed by electron impact with deuterium or tritium and are extracted at the aperture in the focus electrode. The ion source will typically generate a 200 mA beam through a 1.25 cm^2 aperture for an arc current of 10A. For deuterium gas, the ion beam is over 50 percent D^+ with less than 1% impurity. The current density profile across the aperture will typically be uniform to within 20%.

55120 **On the theory of the KVV Auger spectrum of Li.** Schulman, J.N.; Dow, J.D. (Univ. of Illinois, Urbana). *International Journal of Quantum Chemistry, Symposium;* **15**: 437-443(1981). Contract AC02-76ER01198.

Many-body effects on the core-valence-valence Auger lineshape of Li are evaluated in a change-of-mean-field, free-electron model.

6404 Fluid Physics

REFER ALSO TO CITATION(S) 54764

55121 **(IC—82/134) Backflow in two and three dimensions.** Ghassib, H.B.; Chatterjee, S. (International Centre for Theoretical Physics, Trieste (Italy)). Aug 1982. 7p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703540.

The interaction between the backflow patterns generated by two slowly-moving impurities in an arbitrary liquid is examined in both three- and two-dimensional systems. It is concluded that this interaction becomes more important as the dimensionality is reduced.

55122 **(UCRL—53438) Numerical solution to the Stokes equations for flow past two spheres and a chain of particles attached to a sphere, with an application to filter clogging.** Hall, M.S. (Lawrence Livermore National Lab., CA (USA)). Jun 1982. Contract W-7405-ENG-48. 80p. NTIS, PC A05/MF A01. Order Number DE83017882.

Thesis.

The problem of calculating the flow field resulting from two translating spheres is considered. The method of solution chosen consists of representing a moving sphere by a stokeslet and a potential dipole, and a nearby stationary sphere by the images of these singularities. The single sphere with an attached dendrite is next examined. Since this combination body is translating rigidly, the dendrite is represented by stokeslets, while the sphere is again represented by the sum of a stokeslet and a potential dipole. Two methods of distributing singularities in the dendrite are considered. The first approach consists of specifying the locations of the centers of the particles contained in the dendrite and placing a line distribution of stokeslets along a piecewise linear path connecting these points. The second method consists of again specifying the locations of the centers of the particles in the dendrite, but a single stokeslet is placed at each of these points. (LEW)

6451 Particle Interactions And Properties - Experimental

REFER ALSO TO CITATION(S) 54647, 54648, 54649, 54650, 54651, 54652, 54653, 54654, 54655, 54656, 54657, 54658, 54675, 54706, 54722, 54722, 54728, 54729, 55093, 55148, 55190

55123 **(ANL-HEP-CP—82-24) Proceedings of the 1982 summer workshop on proton decay experiments.** Ayres, D.S. (ed.). (Argonne National Lab., IL (USA)). 1982. Contract W-31-109-ENG-38. 494p. (CONF-8206123—). NTIS, PC A21/MF A01. Order Number DE83009572.

From Workshop on proton decay experiments; Argonne, IL, USA (7 Jun 1982).

Portions are illegible in microfiche products.

Separate abstracts were prepared for 18 of the 21 papers presented. Three papers were previously included in the data base. Also included in the proceedings are a workshop summary, working group reports, and a report of the Technical assessment Panel on Proton Decay. (WHK)

55124 (ANL-HEP-CP—82-24, pp 106-128) **Results from the Soudan 1 detector.** Bartelt, J. (Univ. of Minnesota, Minneapolis); Courant, H.; Heller, K. 1982. NTIS, PC A21/MF A01. (CONF-8206123—).

From Workshop on proton decay experiments; Argonne, IL, USA (7 Jun 1982).

We have searched for the spontaneous decay of protons and bound neutrons using Soudan 1, a 31.5-metric-ton iron-loaded concrete tracking calorimeter, instrumented with 3456 proportional tubes. During a live time of 0.382 years, we have observed one candidate event wholly contained within the detector. If we attribute this event to a background source, we can establish a lower bound (90 percent confidence level) on the lifetime for nucleon decay through any of a wide range of modes of 1.0×10^{30} years. The Soudan 1 nucleon decay detector is also capable of identifying slowly moving single particles which traverse the detector if they have velocities between 0.001c and 0.01c, and ionize at least half as much as a relativistic muon. Magnetic monopoles predicted by grand unified theories may satisfy these conditions. During a live time of 0.39 yr, no candidate has been observed implying a 90-percent confidence-level limit on the flux of such objects of less than $4.1 \times 10^{-13}/(cm^2\ sr\ sec)$ over the velocity range above. Results from a study of multiple-muon events are also discussed. The Soudan 1 detector began operation in May 1981, and has produced reliable data since October 1981. We present here preliminary results from three classes of data that have been obtained, on nucleon decay, magnetic monopoles and multiple-muon events.

55125 (ANL-HEP-CP—82-24, pp 389-398) **Lepton nonconservation and double beta decay.** Witherell, M.S. (Univ. of California, Santa Barbara). 1982. NTIS, PC A21/MF A01. (CONF-8206123—).

From Workshop on proton decay experiments; Argonne, IL, USA (7 Jun 1982).

This paper reviews the status of double beta decay as a test of lepton number conservation. Present limits on the mass of a Majorana neutrino are in the range of 10 to 50 eV. Experiments now in progress should substantially improve these limits.

55126 (ANL-HEP-CP—82-24, pp 443-447) **Nuclear reinteraction effects.** Jones, T.W. 1982. NTIS, PC A21/MF A01. (CONF-8206123—).

From Workshop on proton decay experiments; Argonne, IL, USA (7 Jun 1982).

Attempts are being made to observe nucleon decay in different materials, notably water, which contains some free protons, and iron. It is essential to understand how the products of such a decay are modified on their way out of a complex nucleus so that the results of different experiments can be compared. This account will concern itself only with this question and not with possible nuclear effects which modify the nucleon lifetime. It is well known that the reinteraction of the hadronic products of nucleon decay will degrade the visible energy in Cerenkov and tracking detectors, the back-to-back signature, and the charge topology of decay events. Likewise, estimates of the neutrino background based on neutrino - free-nucleon cross sections are affected by nuclear reinteraction. These effects are dominant for pions produced in the $\Delta(1232)$ resonance region. Thus the modes most affected are the decays $p \rightarrow e^+\pi^0$ and $n \rightarrow e^+\pi^-$, where the pion momentum, spread by the Fermi motion, is on the high side of the Δ resonance at 460 MeV/c. For modes which produce ω, eta, and K^+ or K^0 mesons (but not the rho meson), the effects should be much smaller since these mesons decay outside the nucleus and do not excite the Δ resonance. Since neutrino and low-energy photo- pion production in nuclei occur throughout the nuclear volume, they are the processes thought to be most similar to pion production following nucleon decay. Both sets of data have been used as starting points for estimates of pion reinteraction effects following nucleon decay. These data and their interpretation are discussed in turn. Since they lead to conflicting estimates of reinteraction effects, a possible explanation and the need for further calculations are also discussed. (WHK)

55127 (BNL—33659) **Neutrino-oscillation experiments at Brookhaven National Laboratory.** Ahrens, L.A.; Aronson, S.A.; Connolly, P.L.; Gibbard, B.G.; Maeda, Y.; Murtagh, M.J.; Murtagh, S.J.; Terada, S.; Callas, J.; Cutts, D. (Brookhaven National Lab., Upton, NY (USA); Brown Univ., Providence, RI (USA); National Lab. for High Energy Physics, Oho, Ibaraki (Japan); Osaka Univ. (Japan); State Univ. of New York, Stony Brook (USA); Pennsylvania Univ., Philadelphia (USA); California Univ., Irvine (USA)). 1983. Contract AC02-76CH00016. 3p. (CONF-830718—8). NTIS, PC A02/MF A01;1. Order Number DE83018275.

From International Europhysics conference on high energy physics; Brighton, UK (20 Jul 1983).

Portions are illegible in microfiche products.

Two groups have submitted major proposals for neutrino oscillation searches at BNL. Both are two detector experiments with a close detector at $\simeq$ 100m and a far detector at $\simeq$ 900m. While the details of the experiments are quite different, both groups expect to obtain nu/sub μ/ disappearance limits of $\delta\ m^2 \sin 2\theta \simeq 0.1 - 0.2$ for small mass difference and $\sin^2 2\theta$ at the few percent level for the most sensitive $\delta\ m^2 (\simeq 25 eV^2)$. Since both detectors are designed to identify electrons as well as muons they expect to obtain significant limits on nu/sub e/ appearance (nu/sub μ/ $\rightarrow$ nu/sub e/). Each has received approval for a single detector (Phase I) experiment with the two detector phase (Phase II) still pending. The present status of the single detector experiments is detailed. (WHK)

55128 (CERN—83-02, pp 63-97) **Neutrino physics.** Haidt, D. (Deutsches Elektronen-Synchrotron (DESY), Hamburg (Germany, F.R.)). 10 Feb 1983. NTIS (US Sales Only), PC A10/MF A01. (CONF-831216—Vol.1).

From Workshop on SPS fixed-target physics in the years 1984-1989; Geneva, Switzerland (6 Dec 1983).

The author presents a review about neutrino studies. These concern nu/sub tau/ physics, nu oscillations, nu/sub μ/e scattering, neutral-current processes, hadronic final states, and theories.

55129 (CERN—83-02, pp 24-62) **Muon physics and structure function.** Aubert, J.J. (Centre de Physique des Particules, 13 - Marseille (France)). 10 Feb 1983. NTIS (US Sales Only), PC A10/MF A01. (CONF-831216—Vol.1).

From Workshop on SPS fixed-target physics in the years 1984-1989; Geneva, Switzerland (6 Dec 1983).

The author gives a short introduction to the measurement of the structure function by deep inelastic muon scattering.

55130 (CERN—83-02, pp 17-23) **Fermilab fixed target program and schedule.** Yamanouchi, T. (Fermi National Accelerator Lab., Batavia, IL (USA)). 10 Feb 1983. NTIS (US Sales Only), PC A10/MF A01. (CONF-831216—Vol.1).

From Workshop on SPS fixed-target physics in the years 1984-1989; Geneva, Switzerland (6 Dec 1983).

The author describes the research program for the Fermilab fixed target facility. The planned experiments concern neutrino interactions, beam dump studies, muon scattering, dimuon production, hadronic jets, direct photon production, hyperon decays, CP violation, polarized proton physics, and heavy quark states.

55131 (CERN—83-02, pp 98-123) **New particles and decays.** Foa, L. (Istituto Nazionale di Fisica Nucleare, Pisa (Italy); Pisa Univ. (Italy)). 10 Feb 1983. NTIS (US Sales Only), PC A10/MF A01. (CONF-831216—Vol.1).

From Workshop on SPS fixed-target physics in the years 1984-1989; Geneva, Switzerland (6 Dec 1983).

The author presents a review about the experimental study on the decay of charmed and beauty particles.

55132 (CERN—83-02, pp 124-150) **Hadron physics at the workshop.** Petronzio, R.; Treille, D. (European Organization for Nuclear Research, Geneva (Switzerland)). 10 Feb 1983. NTIS (US Sales Only), PC A10/MF A01. (CONF-831216—Vol.1).

From Workshop on SPS fixed-target physics in the years 1984-1989; Geneva, Switzerland (6 Dec 1983).

The authors present a review about the experimental studies on jet physics, photoproduction, prompt photons, gluonium, dileptons, exclusive scattering, and spin physics.

55133 **(CERN—83-02) Workshop on SPS fixed-target physics in the years 1984-1989. Vol. 1. Proceedings.** Mannelli, I. (ed.). (European Organization for Nuclear Research, Geneva (Switzerland)). 1983. 201p. (CONF-831216—Vol.1). NTIS (US Sales Only), PC A10/MF A01. Order Number DE84780005.

From Workshop on SPS fixed-target physics in the years 1984-1989; Geneva, Switzerland (6 Dec 1983).

Papers presented were entered into the data base separately. (WHK)

55134 **(CONF-830374—2) Search for right-handed currents in muon decay.** Gobbi, B. (Northwestern Univ., Evanston, IL (USA). Dept. of Physics and Astronomy). 1983. Contract AC02-76ER02289. 13p. NTIS, PC A02/MF A01. Order Number DE83017856.

From Moriond conference on electroweak interactions; Les Arcs, France (13 Mar 1983).

Portions are illegible in microfiche products.

We report preliminary results of an experiment designed to measure the mass of the right-handed intermediate vector boson. The presence of such a particle in electroweak interactions is predicted by left-right symmetric gauge theories. The experiment measures the momentum spectrum of the positrons from the decay at rest of (1) longitudinally polarized muons produced in the decay at rest of $\pi^+ \rightarrow \mu^+ \nu$ (polarization P/sub μ/) and (2) unpolarized muons. The endpoints of these two spectra are used to determine the quantity xi P/sub μ/ where xi is a Michel parameter. This product is related to the ratio of the mass of left and right handed W and to the phase between the two helicity states. We measure, at the 90% CL, $1 - \delta/\rho < 0.0041$ and infer the mass $M(W_R) > 380$ GeV/c^2.

55135 **(CONF-830798—1) Nucleon-nucleon interactions and polarized-beam (both proton & antiproton) facilities at LAMPF II.** Yokosawa, A. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 13p. NTIS, PC A02/MF A01. Order Number DE83017215.

From 3. LAMPF II workshop; Los Alamos, NM, USA (18 Jul 1983).

We review experimental results of nucleon-nucleon interactions mainly up to 12 GeV/c, and propose polarized-beam (both proton and antiproton) facilities at LAMPF II.

55136 **(DESY—83-010) Dsup(*+-) production by e^+e^- annihilation near 34.4 GeV C.M. energy.** Althoff, M.; Braunschweig, W.; Gather, K.; Kirschfink, F.J.; Luebelsmeyer, K.; Martyn, H.U.; Peise, G.; Rimkus, J.; Sander, H.G.; Schmitz, D. (Deutsches Elektronen-Synchrotron (DESY), Hamburg (Germany, F.R.)). Feb 1983. 7p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83751057.

TASSO Collaboration.

Dsup(*+-) production via $e^+e^- \rightarrow$ Dsup(*+-)X has been measured at an average c.m. energy of 34.4 GeV. The Dsup(*+-) energy spectrum is hard, with a maximum near x=0.6. The size of the Dsup(*) cross section, Rsub(D*)=sigma($e^+e^- \rightarrow$ Dsup(*)X)/sigmasub($\mu\mu$)=2.50+-0.64+-0.88 (assuming Rsub(D*0)=Rsub(D*+)) indicates that a large fraction of charm quark production yields Dsup(*) mesons. The Dsup(*+-) angular distribution exhibits a forward-backward asymmetry, A=-0.28+-0.13. This is consistent with that expected in the standard theory for weak neutral currents and leads to vertical strokegsub(A)sup(c)vertical stroke=0.89+-0.44 for the axial vector coupling of the charm quark.

55137 **(DOE/ER/02289—T3) High-energy photoproduction of states containing heavy quarks and other rare phenomena.** Cumalat, J.; Butler, J.; Gaines, I.; Garbincius, P.H.; Gormley, M.; Harding, D.; Peoples, J.; Cooper, J.; Cormell, L.; Hitzman, C. (Colorado Univ., Boulder (USA); Fermi National Accelerator Lab., Batavia, IL (USA); Pennsylvania Univ., Philadelphia (USA)). 31 Jan 1981. Contract AC02-76ER02289. 51p. NTIS, PC A04/MF A01. Order Number DE83017854.

Portions are illegible in microfiche products.

We propose to study the photoproduction of states containing heavy quarks, charm and beauty, using a multiparticle spectrometer at the Tevatron. The apparatus is similar to that used in E87 and E401, but is upgraded to have a much larger acceptance, better γ and π^0 reconstruction capabilities, and a prompt decay vertex detector. To achieve high sensitivity to low cross sections, the experiment must run in a wide band photon beam, preferably the new beam proposed for the Proton East area. The experiment has two phases. Phase 1 is a 500 hour run with a thick target (1 interaction length) and a beam dump. This phase will produce a large sample of dimuon decays of T's and J/PSI's with energies up to 450 GeV and will measure the size of beauty photoproduction through the detection of multimuon final states. Phase 2 is a 1500 hour run with an open geometry and a 10% interaction length target. We will collect very large samples ($> 10^6$) of charm particle events and will search for specific B-meson and B-baryon final states. The power of the spectrometer and the flexibility of the trigger scheme we employ enables us to do sensitive searches for completely new phenomena with less bias than other experiments.

55138 **(DOE/ER/03065—T3) High-energy physics progress report, 1983-1984.** (Duke Univ., Durham, NC (USA)). 1 Aug 1983. Contract AS05-76ER03065. 34p. NTIS, PC A03/MF A01. Order Number DE83017377.

Portions are illegible in microfiche products.

The scientific work which has engaged our attention in the last eight to ten months is outlined: (1) lifetime measurements of the D^+ and D^0 mesons; study of charm photoproduction mechanisms; (2) study of the radial excitation of vector mesons; (3) other spectroscopy of light quark systems; (4) particle production mechanism at high energies; (5) monitoring systems for lead-glass detectors at BNL and Fermilab; (6) further tests of new concepts for bubble chamber operations; and (7) shifting of operation to modern VAX computer system. Details of this work are given.

55139 **(JINR-R—1-82-353) Hyperon production in nC interactions in the neutron beam with approximately 40 GeV/c momentum.** Aleev, A.N.; Aref'ev, V.A.; Balandin, V.P. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1982. 13p. (In Russian). (CONF-820718—46). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703544.

From 21. international conference on high energy physics; Paris, France (29 Jul 1982).

The results of inclusive productions of hyperons in neutron-carbon interactions at a 40 GeV/c mean beam momentum are reported. The experimental mass spectra given for Λ^0, $\Sigma^{+-}(1385)$, $>^-$, $>^0(1530)$, Ω^-, Λ^0, Σ^+, $>^-$. The method of determining the registration efficiency of hyperons is described. The experimental mass spectra are fitted by the structure function F(x)=(1-x)sup(N) with the Feynman x. The Ω^- production cross section equal to 5+-3 mb has been obtained for the first time. The total cross sections for inclusive production of hyperons are compared with the results of other experimental works.

55140 (LBL—15973, pp 21-27) **Search for hadron jets and large transverse momentum electrons at the SPS anti p p collider.** Banner, M. (CEN, Saclay, France). Apr 1983. NTIS, PC A09/MF A01. (CONF-830224—).

From DPF workshop on collider detectors: present capabilities and future possibilities; Berkeley, CA, USA (28 Feb 1983).

The search of high transverse momentum electrons needs the use of all the different elements of the UA2 detector; therefore the description of this search is a good way to understand the features of the apparatus, and its performance in a collider environment. We present a preliminary analysis of the UA2 data collected during the

last Collider run (20 nb^{-1} integrated luminosity) with particular emphasis on large transverse momentum hadron jets and on electrons having the configuration expected from the decay of electroweak bosons.

55141 **(SLAC-PUB—3099) Status of the iota (1440) and θ (1640) as gluonium candidates.** Lockman, W.S. (Stanford Linear Accelerator Center, CA (USA)). Apr 1983. Contract AC03-76SF00515. 15p. (CONF-830140—7). NTIS, PC A02/MF A01. Order Number DE83010776.

From 18. Rencontre de Moriond conference; La Plagne, France (23 Jan 1983).

A review of the experimental evidence for the iota (1440) and θ (1640) states is presented. The measured properties of these states are compared with various theoretical predictions. A likely interpretation is that these states contain a large gluonic admixture.

55142 **(SLAC-PUB—3187) Tau and B lifetime measurements from the MARK II.** Hanson, G.G. (Stanford Linear Accelerator Center, CA (USA)). Aug 1983. Contract AC03-76SF00515. 3p. (CONF-830718—6). NTIS, PC A02/MF A01. Order Number DE83018219.

From International Europhysics conference on high energy physics; Brighton, UK (20 Jul 1983).

Measurement of the tau lifetime checks whether the tau couples to the charged weak current with the same universal coupling strength as the e and μ. The lifetime of bottom hadrons measures the weak coupling between the bottom quark and the charm and up quarks. Measurements of these lifetimes have been made with the MARK II detector at the e^+e^- storage ring PEP at 29.0 GeV center-of-mass energy at the Stanford Linear Accelerator Center.

55143 **(DESY-L-Trans—269) Masses, decay modes and lifetimes of charmed particles.** Vaisenberg, A.O. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Teoreticheskoj i Ehksperimental'noj Fiziki). Nov 1982. Translation of ITEP—5, 1982. 29p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83781138.

Translated from Russian.

In this review, we analyze all principal experimental data available before the middle of 1981. The lifetimes of charmed particles is proportional 10^{-13} sec and "vivid" targets, i.e. detectors of the interaction vertex with good space solution are required for their measurements on the basis of the decay length l. In section 1 of this review, the most important predictions of the theory of charmed particle properties are presented. Experimental data for their masses and decay modes have been accumulated in section 2. In section 3 follows a description of the main experiments. In the last chapter 4, the results will be listed and discussed.

6452 Particle Interactions And Properties - Theoretical

REFER ALSO TO CITATION(S) 55141

55144 (ANL-HEP-CP—82-24, pp 64-105) **Theoretical perspective for baryon number violation.** Langacker, P. (Univ. of Pennsylvania, Philadelphia). 1982. NTIS, PC A21/MF A01. (CONF-8206123—).

From Workshop on proton decay experiments; Argonne, IL, USA (7 Jun 1982).

In this talk I describe the theoretical predictions for proton decay and other baryon number violating processes, emphasizing that there are many models and theories involving baryon number violation and that it is an experimental problem to distinguish between them. I first review the the theoretical predictions for the unification mass M/sub X/ and for the weak angle sin^{2}theta/sub W/. It will be seen that the class of models involving an $Su_3 \times SU_2 \times U_1$ invariant desert between M/sub W/ and M/sub X/ are strongly favored. I then turn to baryon number violation. The proton lifetime and branching ratio predictions for the SU_5 and other 3-2-1 desert models are reviewed, with emphasis on distinguishing between models and on the implications of the small value of the QCD parameter lambda/sub anti MS/ that seems to be favored by the data. I then discuss the consequences of low energy supersymmetry for proton decay, nuclear effects, and models with low mass scales. Finally, I mention possible implications of the anomalously large flux of cosmic ray antiprotons that has recently been reported.

55145 **(CONF-830588—4) Meson-exchange Hamiltonian for NN scattering and isobar-nucleus dynamics.** Lee, T.S.H. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 22p. NTIS, PC A02/MF A01. Order Number DE83017974.

From Delta-Nucleus dynamics symposium; Argonne, IL, USA (2 May 1983).

Portions are illegible in microfiche products.

We have constructed a meson-exchange Hamiltonian for π, N, Δ and N^* for NN scattering up to 2 GeV. The model gives good descriptions of the Arndt phase-shifts up to 1 GeV in both the T = 0 and T = 1 channels. The calculated total cross sections σ/sup tot/, $\Delta\sigma$/sub L//sup tot/ and $\Delta\sigma$/sub T//sup tot/ agree to a large extent with the data in both the magnitudes and the signs. The present calculation gives a sound starting point for future refinements. Among them, a large-scale three-body calculation could be needed to investigate the energy dependence of the effect due to NN interactions in the πNN channel. Until this effect is carefully studied, it is premature to extract information on dibaryon resonances, if they exist, from the data. Our model also gives definite predictions of np scattering. Precise np polarization measurements at higher energy > 0.6 GeV are needed to have a complete test of our model. Finally, the present model Hamiltonian can be used to carry our many-body calculations.

55146 **(DESY—83-012) Lattice QCD with light quark masses: Does chiral symmetry get broken spontaneously.** Barbour, I.M.; Schierholz, G.; Teper, M.; Gilchrist, J.P.; Schneider, H. (Deutsches Elektronen-Synchrotron (DESY), Hamburg (Germany, F.R.)). Mar 1983. 14p. (LAPP-TH—74). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83751058.

We present a first direct calculation of the properties of QCD for the small quark masses of phenomenological interest without extrapolations. We describe methods specially adapted to invert the fermion matrix at small quark masses. We use these methods to calculate <anti psi psi> directly on presently used lattice sizes with different boundary conditions. As is to be expected for a finite system, we do not observe spontaneous chiral symmetry breaking. By comparing the results obtained on lattices of different size we see, however, indications that are consistent with eventual spontaneous chiral symmetry breaking in the infinite volume limit. Our calculations underline the importance of using antiperiodic boundary conditions for fermions.

55147 **(ICR—87-81-3) Hadronic interactions at energies around 10^3 TeV inferred from the large-scale emulsion chamber experiment at Mt. Fuji.** Akashi, M.; Amenomori, M.; Konishi, E. (Tokyo Univ., Tanashi (Japan). Inst. for Cosmic Ray Research). 1 May 1981. 47p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83702974.

Details of experimental results, obtained with the large-scale emulsion chambers at Mt. Fuji (3776 m above sea level), are presented to investigate the hadronic interactions at energies around 10^3 TeV, comparing with the Monte Carlo simulation based on various assumed interaction models and primary particles. It may be briefly summarized as 1) Scaling in the fragmentation region can be valid up to 10^3 TeV at least only if the primary particles are mixed, with significant amounts of heavy nuclei at energies over 10^{14} eV, 2) Cross sections should continue to increase with energy up to 10^3 TeV, at least, at almost the same rate as that obtained at lower energies, 3) There exist some evidence to indicate remarkable production of particles or jets with high P sub(t) of several GeV/c at energies around 10^3 TeV, 4) Hadron to gamma-ray ratios in the observed family events remain almost within the scope of simulation prediction. Other interesting characters of family events are also discussed.

55148 **(IFVE-OTF—82-125) Invariant current algebra on the light cone and deep inelastic lepton-hadron scattering. 3. Neutrino reactions.** Lunev, F.A. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1982. 15p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703543.

The consequences of invariant current algebra on the light cone (ICALC) are considered. The form factor singularity restrictions are studied for the $\nu(\text{anti }\nu)N \to \mu^-(\mu^+)X$ interaction on the light cone. The asymptotic restrictions resulting from the ICALC commutational relationships on behaviour of structure functions of deep-inelastic scattering of neutrinos on nucleons are obtained.

55149 **(JINR—E-1-82-287) Study of the particle production process using nuclear targets. Pt. 3 Effects testable in hadron-nucleon experiments, nature of intermediate objects, conclusion.** Strugalski, Z. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1982. 16p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702954.

In the study of the particle production process, using nuclear targets as detectors, results have been obtained which prompted to conclude that the particle production in hadron-nucleon collisions is mediated by intermediate objects created first. The existence of such objects should manifest itself in the elementary hadron-nucleon collisons as well. A search of appropriate effects testable experimentally has been performed in analysing of existing experimental data on the nucleon-nucleon collisions. In result, it can be concluded that: a) many such effects are known from numerous experiments in which nucleon-nucleon collisions have been studied; b) none of properties of the proton-proton collisions contradict the picture of the particle production process prompted by experiments with nuclear targets; c) the particle-producing nucleon-nucleon collisions may be treated in their early stage as $2 \to 2$ endoergic reactions.

55150 **(JINR—E-2-82-745) Relativistic string theory and nonlinear two-dimensional sigma-model.** Nesterenko, V.V. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). 1982. 8p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703536.

It is shown in what way the nonlinear two-dimensional SO(1, 2)/SO(1, 1) sigma-model appears in the theory of the relativistic string, moving in three-dimensional Minkowski space. The results give rise to the question: is the relativistic string theory in the three-dimensional space-time equivalent to the nonlinear sigma model. At first sight this equivalence might take place, because the string theory is reduced to the Liouville equation too. However, this is not so. In contrast to the sigma model where the knowledge of solution of the Liouville equation allows to obtain both the quadratic forms of the hyperboloid, in the string theory only the first quadratic form can be reconstructed by this solution.

55151 (LBL—15973, pp 28-29) **Cross section estimates for multi-TeV physics.** Cahn, R.N. (Lawrence Berkeley Lab., CA). Apr 1983. NTIS, PC A09/MF A01. (CONF-830224—).

From DPF workshop on collider detectors: present capabilities and future possibilities; Berkeley, CA, USA (28 Feb 1983).

This note provides rough estimates for cross sections of interest in the multi-TeV regime.

55152 **(LBL—16295) Quark-gluon plasma formation.** Gyulassy, M. (Lawrence Berkeley Lab., CA (USA)). Jun 1983. Contract AC03-76SF00098. 11p. (CONF-830674—4). NTIS, PC A02/MF A01. Order Number DE83017742.

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

The production of high baryon density plasmas at 10 GeV/A and low baryon density plasmas at 1 TeV/A via nuclear collisions is discussed.

55153 **(DESY-L-Trans—271) P-odd effects for the one-photon mechanism of three-jet e^+e^- -> qanti q + π^{+-} processes.** Rekalo, M.P. Translated from *Ukrainskii Fizicheskii Zhurnal (Russian Edition)*; **27**: No. 10, 1442-1447(Oct 1982). 8p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83781137.

Translated from Russian.

In this paper, we study P-odd effects due to the single-photon mechanism of three-jet processes at colliding e^+e^--beams $e^+ + e^- \to q + \text{anti } q + \pi$ (q is a quark producing the hadron jet), where a single pion is one jet. We assume that the violation of P-invariance depends on the P-odd vertex of π qanti q-interaction. Within the framework of CP-invariant theory, P-odd effects should only arise due to this mechanism in charged pion production. We analyze the general structure of the differential cross-section for the one-photon mechanism with P-invariance breaking and we calculate the contributions to the differential cross-section of the $e^+e^- \to q + \text{anti } q + \pi$ process using the Born approximation for the $\gamma^{(*)} \to q + \text{anti } q + \pi$ process.

55154 **Expected mixing angles or is there evidence for horizontal symmetries?.** Goldman, T. (Los Alamos National Lab., Los Alamos, NM). pp 111-120 of Gauge theories, massine neutrinos, and proton decay. Kursunoglu, B.; Perlmutter, A. New York, NY; Plenum (1981).

Statistical techniques are used to develop criteria for unusual generation mixings and mass ratios which would signal the existance of quantum numbers of a horizontal symmetry. It is concluded that small fermion mass ratios (between generations) are consistent without the existence of horizontal symmetries; that the size of the Cabibbo angle is "normal" and need not be related to horizontal symmetries; that the mixing between the second and third generations may be larger than between the first and second; that more direct evidence that mass ratios and mixings is necessary to determine the existence of a horizontal symmetry; and finally; that large neutrino mixing angles and almost degenerate neutrino masses are not theoretically excluded.

6453 Particle Invariance Principles And Symmetries

REFER ALSO TO CITATION(S) 55146

55155 **(DOE/ER/01545—338) Studies of chiral symmetry breaking in lattice gauge theory.** Shigemitsu, J. (Ohio State Univ., Columbus (USA). Dept. of Physics). 1983. Contract AC02-76ER01545. 24p. NTIS, PC A02/MF A01. Order Number DE83017891.

We study chiral symmetry breaking in SU(2) and SU(3) lattice gauge theory using the quenched approximation. For the SU(2) theory we consider quarks in the $l=1/2$, $l=1$, $l=3/2$ and $l=2$ representations and find evidence for a hierarchy of relevant energy scales. In the SU(3) theory with fundamental quarks both the deconfinement and the chiral symmetry restoration transition occurs at the same temperature. In the absence of dynamical quark loops both transitions are first order.

55156 **Observability of heavy Higgs bosons.** Ward, B.F.L. (Stanford Linear Accelerator Center, CA (USA)). *Nuovo Cimento [Sezione] A;* **74**: No. 4, 413-426(21 Apr 1983). Contract AC03-76SF00515.

It is argued that, in certain popular heavy-color scenarios in which the Higgs sector of the standard $SU_2 \times U_1$ electroweak theory is generated dynamically, the physical Higgs particle, of zeroth-order mass msub(H), has a pole of its propagator. For conventional values of the parameters, a Higgs particle with msub(H)=0.383 TeV has a width of 0.663 TeV.

6454 Field Theory

REFER ALSO TO CITATION(S) 55146, 55155

55157 (BNL—33649) Progress in lattice gauge theory. Creutz, M. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 20p. (CONF-8306125—1). NTIS, PC A02/MF A01. Order Number DE83014055.

From 4. Adriatic meeting on particle physics; Dubrovnik, Yugoslavia (6 Jun 1983).

These lectures first provide an overview of the current status of lattice gauge theory calculations. They then review some technical points on group integration, gauge fixing, and order parameters. Various Monte Carlo algorithms are discussed. Finally, alternatives to the Wilson action are considered in the context of universality for the continuum limit. 41 references.

55158 (JINR—E-2-82-671) Phase transitions in the euclidean and hamiltonian approaches in the lattice gauge theories at finite temperature. Gerdt, V.; Mitryushkin, V.K. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). 1982. 6p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703533.

Thermodynamic properties of the gluon gas at finite temperatures have been studied within the lattice gauge theory with SU(2)-symmetry. The temperature dependence of the Wilson string on symmetric (asub(t)=asub(s)) and nonsymmetric (asub(t) not equal to asub(s)) lattices has been studied by the Monte-Carlo method. The relation between the interaction constants in both approaches and the ratio of renormalization constants are found.

55159 (JINR—E-2-82-681) Diagram summation method in Schwinger source theory. Vyshensky, S.V. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). 1982. 4p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703534.

The origin of non-physical singularities in total quantum electrodynamics propagators is discovered. A consistent method of obtaining equations for the total Green functions is developed. Exact and approximate solutions of these equations are free of non-physacal singularities and analytic in coupling constant at zero. The photon propagator in one-loop approximation for the polarizable operator is considered.

65 PHYSICS RESEARCH

6510 Nuclear Physics

REFER ALSO TO CITATION(S) 54506

55160 (BNL-NCS—51684) Annotated bibliography covering generation and use of evaluated cross section uncertainty files. Peelle, R.W.; Burrows, T.W. (Oak Ridge National Lab., TN (USA); Brookhaven National Lab., Upton, NY (USA)). Mar 1983. Contract AC02-76CH00016. 31p. NTIS, PC A03/MF A01. Order Number DE83017884.

Literature references related to definition, generation, and use of evaluated cross section uncertainty (variance-covariance) files are listed with comments intended primarily to guide the reader toward materials of immediate interest. Papers are also cited that cover covariance information for individual experiments and that relate to production and use of multigroup covariance matrices. Titles are divided among several major categories.

55161 (INDC—37/U) Minutes of the twelfth INDC meeting, Vienna, 5-9 October 1981. Yiftah, S. (International Atomic Energy Agency, Vienna (Austria). International Nuclear Data Committee). Aug 1982. 82p. (CONF-8110281—1). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83703553.

From 12. INDC meeting; Vienna, Austria (5 Oct 1981).

The Twelfth Meeting of the INDC was held at IAEA Headquarters in Vienna from 5-9 October 1981. The meeting was attended by 13 committee members (member from Australia excused), six advisers and three observers from 14 Member States and two international organisations. The committee reviewed the nuclear data activities of the IAEA, in Member States and in nuclear data centres during the period since its Eleventh Meeting in Vienna in June 1980. It also discussed and reviewed in detail the Agency's future nuclear data programme for the period 1982-84. In general, the IAEA nuclear data programme reflects the trends discussed and detailed at the 11th INDC Meeting. The official minutes include summaries of the discussions of the agenda items, full reports of subcommittees, list of actions, together with lists of participants and subcommittee membership.

55162 (INDC(NDS)—133/NE) IAEA advisory group meeting on nuclear structure and decay data, Zeist, The Netherlands, 11-14 May 1982. Summary report. Lorenz, A. (ed.). (International Atomic Energy Agency, Vienna (Austria). International Nuclear Data Committee). Aug 1982. 96p. (CONF-8205194—Summ.). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83703551.

From IAEA meeting on nuclear structure and decay data; Zeist, Netherlands (11 May 1982).

The IAEA Nuclear Data Section convened the fifth meeting of the international nuclear structure and decay data network at Zeist near Utrecht, in The Netherlands, 11-14 May 1982. The meeting was attended by 24 scientists from 11 Member States and 2 international organizations, concerned with the compilation, evaluation, and dissemination of nuclear structure and decay data.

55163 (INDC(SEC)—82/UN) INDC correspondents for the exchange of nuclear data information. (International Atomic Energy Agency, Vienna (Austria). International Nuclear Data Committee). Jun 1982. 76p. NTIS (US Sales Only), PC A05/MF A01. Order Number DE83703574.

This list serves as a basis for the distribution of documents originated by or for the International Nuclear Data Committee and includes the names of all recipients of INDC documents. The INDC Secretariat tries to maintain this list up-to-date in order to facilitate an efficient interchange of information on nuclear data topics. In this report, the names are listed in alphabetical order within each state or organization. The main list is followed by four shorter lists, indicating the names of individuals in each distribution category, and the total number of individuals in each category.

55164 (ZfK—488) Joint annual report 1981. Hohmuth, K. (ed.). (Zentralinstitut fuer Kernforschung, Rossendorf bei Dresden (German Democratic Republic); Bergakademie Freiberg (German Democratic Republic). Sektion Physik; Friedrich-Schiller-Universitaet, Jena (German Democratic Republic). Sektion Physik; Humboldt-Universitaet, Berlin (German Democratic Republic). Sektion Physik; Karl-Marx-Universitaet, Leipzig (German Democratic Republic). Sektion Physik; Akademie der Wissenschaften der DDR, Leipzig. Zentralinstitut fuer Isotopen- und Strahlenforschung). Oct 1982. 268p. (In German). NTIS (US Sales Only), PC A12/MF A01. Order Number DE83703475.

Results of research work carried out at the ZfK Rossendorf and other scientific institutions of the GDR in 1981 are presented in individual summaries covering the following topics: nuclear reactions, nuclear spectroscopy, nuclear theory, applied methods of nuclear physics, accelerators, nuclear electronics, computer programs. A list of publications is included.

6511 Experimental Techniques

REFER ALSO TO CITATION(S) 55218

55165 (INS—403) Nuclear physics experiment at INS. Sugimoto, K. (Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study). Feb 1981. 44p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83702951.

Present activities at the Institute for Nuclear Study (INS) are presented. Selected topics are from recent experiments by use of the INS cyclotron, experiments at the Bevalac facility under the INS-LBL collaboration program, and preparatory works for the

Numatron project, a new project for the high-energy heavy-ion physics.

6512 Nuclear Properties And Reactions, A=1-5

55166 (PB—83-202531) Photodisintegration of the deuteron, 1982. Fuller, E.G. (National Bureau of Standards, Washington, DC (USA). Radiation Physics Div.). Mar 1983. 23p. (NBSIR—83-2647). NTIS, PC A02/MF A01.

Measurements of the deuteron's photodisintegration cross section made over a thirty year time span are evaluated in terms of the cross section for E1 and M1 transitions calculated in the effective range approximation. The energy range covered is from threshold to 44 MeV. Data that do not depend on a knowledge of a bremsstrahlung spectrum's intensity or spectral distribution are shown to be described very well by the effective-range expressions. The values of the deuteron's electric polarizability is shown to be in fair agreement with a value derived from the observed deviation from Rutherford scattering of deuterons by 208Pb. A comparison is made of the experimental data with three recent calculations of the photodisintegration cross section.

6513 Nuclear Properties And Reactions, A=6-19

REFER ALSO TO CITATION(S) 55183

55167 (IC—82/137) Binding energy calculations using the molecular orbital wave function. Hassan, M.Y.M.; Rabie, A.; Ismail, E.H. (International Centre for Theoretical Physics, Trieste (Italy)). Aug 1982. 11p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703548.

The molecular orbital wave function is used in describing the 4 N-nuclei internal wave function. Using the variational technique the binding energies of the nuclei ^{12}C, ^{16}O, ^{20}Ne and ^{24}Mg are calculated using different Skyrm interaction parameters. Both v.m.s. radii and binding energies obtained in this work are comparable with the corresponding experimental values.

55168 (INP—1106/PL) Fusion of heavy ions in an interaction potential model. Zipper, W. (Institute of Nuclear Physics, Krakow (Poland)). 1980. 100p. (In Polish). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83702950.

The paper contains the problems connected with fusion processes in heavy ions collision. Results of experimental fusion data for reactions: $^{9}Be + ^{12}C$, $^{6}Li + ^{28}Si$, $^{9}Be + ^{28}Si$, $^{12}C + ^{28}Si$, $^{12}C + ^{16}O$ and $^{16}O + ^{16}O$ are presented. Comparison of measured fusion cross sections with predictions of the fusion potential model have been made. The validity of this model for both light systems, like $^{9}Be + ^{12}C$ and heavy systems, like $^{35}Cl + ^{62}Ni$, have been discussed. In conclusion, it should be stated that fusion cross sections could be correctly predicted by the potential model with a potential describing the elastic scattering data.

55169 (JINR—E-1-82-352) Correlation effects in multiple particle production on nuclei in the cumulative region. Anoshin, A.I.; Baldin, A.M.; Lyubimov, V.B.; Solov'ev, M.I.; Suleimanov, M.K. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1982. 10p. (CONF-820718—40). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702955.

From 21. international conference on high energy physics; Paris, France (29 Jul 1982).

In $\pi^-{}^{12}C$ interactions selected on pictures from the 2 m propane bubble chamber exposed to 40 GeV/c π^--mesons, the following characteristics of secondaries have been studied: average momenta, average emission angles, average rapidities as functions of the variable which characterizes the order of cumulativity. It has been found that the region of cumulative interactions with the boundary on the cumulative number nsub(c) approximately equal to 0.6 is distinctly singled out for all the studied properties. The observed peculiarities of these interactions are discussed. An indication is obtained of a peak in the angular distribution of protons from these events (at an angle of theta approximately equal to 60 deg) which has been previously observed in investigations of collisions accompanied by the complete disintegration of the carbon nucleus.

55170 (JINR—E-1-82-377) Study of the proton momentum spectrum from deuteron fragmentation at 8.9 GeV/c and an estimate of admixture parameters for the six-quark state in deuteron. Ableev, V.G.; Abdushukurov, D.A.; Avramenko, S.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1982. 13p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703555.

Using a magnetic spectrometer with proportional chambers and Cherenkov counters, the momentum spectrum of protons emitted at angles below O.4 deg in the stripping reaction $d+^{12}C \rightarrow p+X$ has been measured at a deuteron momentum of 8.9 GeV/c for the proton momentum in the range of 3.56 GeV/c <= p <8.05 GeV/c (-206 MeV/c <= p*sub(parallel) <= 580 MeV/c in the deuteron rest system). From the analysis of the invariant cross sections the estimates of parameters of six-quark state admixture in a deuteron are obtained: the admixture-(3.1+-0.2)%, the average square radius of the six-cquark state-(0.87-0.10) Fm, a relative phase of two-nucleon and six-quark components-(61 deg +- 11 deg) for the two-nucleon Reid wave function with a soft core, respectively, =(4.3+-0.4)%, (0.95+-0.05) lm and (82 deg +- 6 deg) for the Paris potential wave function. In the proton momentum region of 296 MeV/c <p*sub(parallel) <= 378 MeV/c a peculiarity in the spectrum has been observed corresponding kinematically to the production of a dibaryon resonance with a mass ranging from 2.0 to 2.2 GeV.

55171 (JINR—E-1-82-517) Inelastic scattering of 8.9 GeV/c deuterons on carbon. Ableev, V.G.; Dimitrov, Kh.; Filipkowski, A. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1982. 7p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702956.

Using the magnetic spectrometer "Alpha", detailed measurements of the momentum spectrum of the deuterons, scattered inelastically on a carbon target in an angular interval of 0 <= theta < 0.4 deg, have been performed. After the scattering the deuterons lost up to 30% of an initial momentum of 8.9 GeV/c.

55172 (JINR—R-1-81-773) Detection of inverse electroproduction of pions on ^{7}Li nuclei. Alekseev, G.D.; Blokhintseva, T.D.; Gorchakov, O.E. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1981. 10p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702957.

The process of inverse electroproduction of pions on a ^{7}Li nucleus $\pi^+ + {}^{7}Li \rightarrow e^+ + e^- + X$ at pion kinetic energy of 380 MeV has been detected. Missing mass distribution of events in the process is well described assuming that approximately a half of the detected events belongs to the reaction channel which produces ^{7}Be either in the ground state (^{7}Be) or in the excited state ($^{7}Be^*$): $\pi^+ + {}^{7}Li \rightarrow e^+ + e^- + {}^{7}Be({}^{7}Be^*)$. The electrons and positrons with an energy over 70 MeV emitted at approximately 65 deg is $d^2\sigma/d\Omega^2 = (1.3+-0.3)\times10^{-32}$ cm^2/sr^2.

55173 (JINR—R-1-82-393) Analysis of hadron jet behaviour in πpC interactions at 40 GeV/c. Grishin, V.G.; Didenko, L.A.; Eliseev, S.M.; Kanarek, T.; Metreveli, Z.V.; Murzin, V.S. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1982. 10p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702958.

The average value of "sphericity" S is determined for all the multinucleon π^-C collisions at 40 GeV/c. The dependence of S variable on nucleon collision number is investigated. The obtained results are compared with the data on π^-N interactions at 40 GeV/c and with tha data on e^+e^- annihilation. The calculations of S value within the cascade model of pion-carbon collisions are presented. Jet characteristics of multinucleon π^-C collisions at 40 GeV/c, in the whole, differ sufficiently from jet characteristics of e^+e^- and hadron-hadron collisions. The account of particle rescattering in nuclei at simplest approximation of cascade model gives the growth of sphericity and allows to distinguish qualitatively the sphericity difference of behaviour at elementary and nuclear inter-

actions. Jet characteristics of the secondary hadrons, moving in the direction of primary pions, in multinucleon π^-C collisions at 40 GeV/c and their dependence on energy agree well with data for e^+e^- annihilation and hadron-hadron interactions at identical energies of colliding particles.

55174 **(JINR—R-1-82-534) Characteristics of secondary neutrons in the πp p, π^- n, π^- ^{12}C interactions at P--40 GeV/c.** Grishin, V.G.; Korbel, Z.; Muminov, M.M.; Musalova, L.M.; Suvonov, I.; Trka, Z.; Trkova, Ya.; Kholan, P.; Yanichko, P. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1982. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702959.

Distributions of neutron momenta (psub(n)>=1 GeV/c) have been obtained in π^-p-, π^-n- and π^- ^{12}C-interactions at 40 GeV/c by means of studying secondary neutral stars induced by neutrons in 2m propane bubble chamber. The following values of the mean neutron momenta have been obtained: <psub(n)>=2,2+-0.1; 1.7+-0.2; 1.7+-0.1 GeV/c in above mentioned reactions. The average numbers of neutrons have also been estimated: <Nsub(n)(πsup(-)p)>=0.37+-0.04; <Nsub(n)(πsup(-)n)>=0.63+-0.07 and <Nsub(n)(πsup(-) sup(12)C)>=1.32+-0.06.

55175 **(TU-Inf—05-09-80) Calculation of fusion cross sections.** Henniger, J.; Huebner, K.; Horlbeck, B. (Technische Univ., Dresden (German Democratic Republic). Sektion Physik). 1980. 16p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703550.

For calculating secondary radiation fields of heavy ion accelerators it is necessary to know the heavy ion fusion reaction cross sections. The calculations are based on the static fusion model according to Schmidt. The critical values and calculating parameters are compiled for ^{14}N, ^{22}Ne, and ^{40}Ar reactions with ^{27}Al, ^{56}Fe, ^{65}Cu, and ^{238}U targets. For demonstration fusion cross sections have been calculated for the reactions ^{40}Ar+^{77}Se, ^{12}C+^{12}C, and ^{16}O+^{27}Al and compared with experimental data.

55176 **Experimental determination of the effective nucleon-nucleon interaction for P-nucleus reactions at intermediate energies.** McClelland, J.B.; Moss, J.M. (Los Alamos National Lab., NM (USA)); Aas, B.; Azizi, A.; Bleszynski, E.; Bleszynski, M.; Geaga, J.; Igo, G.; Rahbar, A.; Wagner, J. *Nuclear Physics* [*Section*] *A;* **396**: 29c-36c(21 Mar 1983). (CONF-820828—).

From 9. EPS Nuclear Physics Divisional conference on nuclear structure; Amsterdam, Netherlands (29 Aug 1982).

A complete measurement of the polarization transfer observables has been made for the first time in the (p, p') reaction at intermediate energies. Measurements are reported for the ^{12}C(p, p')^{12}C reaction to the 1^+, T=0(12.71 MeV) and 1^+, T=1(15.11 MeV) states at 500 MeV at laboratory scattering angles of 3.5°, 5.5°, 7.5°, and 12.0°. Linear combinations of these observables are shown to exhibit a very selective dependence on the isoscalar and isovector spin-dependent components of the nucleon-nucleon interaction. To the extent of the validity of the single collision approximation, these amplitudes are compared directly to the free nucleon-nucleon amplitudes at small momentum transfers (<1 fm^{-1}).

55177 **Study of isovector resonances with pion charge exchange.** Baer, H.W.; Bolton, R.; Bowman, J.D.; Cooper, M.D.; Cverna, F.; King, N.S.P.; Leitch, M.; Matis, H.S. (Los Alamos National Lab., NM (USA)); Alster, J.; Doron, A. *Nuclear Physics* [*Section*] *A;* **396**: 437c-453c(21 Mar 1983). (CONF-820828—).

From 9. EPS Nuclear Physics Divisional conference on nuclear structure; Amsterdam, Netherlands (29 Aug 1982).

Also published as conference report LA-UR--82-1600; CONF--820828-1.

Studies with the pion charge exchange reactions (πsup(+-), π^0) at 164 MeV using the π^0 spectrometer are yielding new results on the existence and systematic features of isovector resonances in nuclei. These experiments possess an unusually high signal/background ratio for isovector resonances of low-multipolarity. Results obtained to date are: (1) Observation and angular distribution measurement of the giant dipole resonances in nuclei ^{12}C, ^{40}Ca, ^{90}Zr, and ^{120}Sn; (2) Observation and angular distribution measurements in the (π^-, π^0) reaction on ^{90}Zr and ^{120}Sn of large signals possessing the expected angular distribution shapes and magnitudes for the isovector monopole resonance. Excitation energies are near the hydrodynamical model values 170 Asup(-1/3) MeV. Differential cross sections are approximately 0.7 J^2 (qR) mb/sr. An overview of this experimental program, with emphasis on new results, and how they correlate with existing knowledge on the isovector resonances, is given.

6514 Nuclear Properties And Reactions, A=20-38

REFER ALSO TO CITATION(S) 55167, 55168, 55175, 55183

55178 **(JINR—R-3-82-303) Study on the ^{22}Na(n,p)^{22}Ne reaction at the neutron energy up to 1000 eV.** Gledenov, Yu.M.; Kvitek, I.; Marinova, S. ; Popov, Yu.P.; Rigol', Kh.; Salatskij, V.I. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics). 1982. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702962.

The (n,p) reaction on the radioactive ^{22}Na nucleus has been investigated using the silicon semiconductor spectrometer by the time-of-flight method. Measurements were carried out at the IBR-30 reactor of LNF JINR. A dependence of the (n,p) reaction effective cross section on the neutron energy in the energy range up to 1000 eV has been found out. The resonance with E_0 147+- 11 eV, GITAsub(n)sup(0) = 3.4 +- 0.9 eV, GITAsub(p1) = 90 +- 26 eV has been found out. This resonance explains large value of the reaction cross section at thermal neutron energies. The result obtained permits to refine the ^{23}Na nucleus excited state energy scale.

6515 Nuclear Properties And Reactions, A=39-58

REFER ALSO TO CITATION(S) 55175, 55177, 55183

6516 Nuclear Properties And Reactions, A=59-89

REFER ALSO TO CITATION(S) 55168, 55175

55179 (CEA-N—2296, pp 143-145) **Fragment emission in reactions of 18.5 GeV ^{12}C ions with complex nuclei.** Porile, N.T.; Cole, G.D. (Purdue University, W. Lafayette, IN (USA)). May 1982. NTIS (US Sales Only), PC A08/MF A01. (CONF-820536—).

From International conference on selected heavy ion reactions; Saclay, France (3 May 1982).

The emission of fragments ranging from ^{24}Na to ^{52}Mn in reactions of 18.5 GeV ^{12}C ions with Cu, Ag, Gd, Ta, Au, and U targets has been studied by means of activation techniques. The experiments involved determination of the fragment production cross sections and thick-target recoil properties. The latter were used to obtain mean fragment kinetic energies and the forward velocity component of the struck nucleus (in units of c). The results are compared with similar data for incident protons of the same total kinetic energy.

55180 **(JINR—R-3-82-411) Parity nonconservation in neutron resonances.** Alfimenkov, V.P.; Borzakov, S.B.; Vo Van Tkhuan; Mareev, Yu.D.; Pikel'ner, L.B.; Khrykin, A.S.; Sharapov, Eh.I. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics). 1982. 16p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702963.

The experiments are described on observation of the parity nonconservation effect in p-wave neutron resonances of ^{81}Br, ^{111}Cd, ^{117}Sn, ^{127}I, ^{139}La, ^{239}U. The measurements were performed on the beam of polarized neutrons from the pulsed reactor IBR-30 at Dubna. The dependence of the total cross sections on neutron helicity was discovered in the following resonances: 0.88 eV ^{81}Br, 4.53 eV ^{111}Cd, 1.33 eV ^{117}Sn and 0.75 eV ^{139}La. The effect has a resonance character and is in agreement with theoretical predictions made in the frame of the model of mixing compound states.

The experimental estimates for the mixing coefficients and matrix elements are presented.

55181 Inelastic scattering of ^{16}O from ^{60}Ni at 114 MeV. Hansen, O.; Bond, P.D.; Kubono, S.; Levine, M.J.; Thorn, C.E. (Brookhaven National Lab., Upton, NY (USA). Physics Dept.). *Nuclear Physics [Section] A;* **398**: No. 2, 325-342(25 Apr 1983).

The $^{60}Ni(^{16}O, ^{16}O')$ reaction has been measured with about 100 keV energy resolution at a bombarding energy of 114 MeV. Twelve transitions to 2^+, 3^-, 4^+ and 5^- states were observed in the region below 5.8 MeV excitation and angular distributions of the corresponding differential cross sections were measured. DWBA and CC analyses are presented and spectroscopic information, in particular pertaining to the two-phonon strengths, is deduced. The deformation lengths βsub(L)R_s are compared to previous results from inelastic scattering with ^4He, ^{14}C, and ^{16}O particles. Supplementary data in the region of the giant quadrupole resonance (GQR) were obtained, although the GQR was not identified. The experimental results are used in a discussion of the energy loss process in heavy ion collisions.

6517 Nuclear Properties And Reactions, A=90-149

REFER ALSO TO CITATION(S) 55177, 55179, 55180

55182 (CEA-N—2296, pp 146) Reactions induced on ^{93}Nb by α particles up to 140 MeV. Gadioli, E.; Gadioli Erba, E. (Universita di Milano (Italia)); Hogan, J.J. (McGill University, Montreal (Canada)); Jacak, B.V. (MSU, Michagan (USA)). May 1982. NTIS (US Sales Only), PC A08/MF A01. (CONF-820536—).

From International conference on selected heavy ion reactions; Saclay, France (3 May 1982).

The excitation functions for 29 reactions induced by 40-140 MeV α particles on 93 Nb have been measured by activation techniques. The irradiations have been made at LBL 88 inch cyclotron at incident energies below 120 MeV and at the Maryland cyclotron at the higher energies. The reactions investigated ranged in complexity from (α,n) to (α,6p8n). A reasonable reproduction of these excitation functions has been obtained by assuming that the major contribution to the reaction cross section, σsub(R), be the one the processes originated by (a) the dissolution -due to the nuclear field- of the α in four nucleons which start an intranuclear cascade of nucleon-nucleon collisions, (b) an α-nucleon interaction.

55183 (ITEF—123(1982)) Deuteron production in proton-nucleus interactions at 7.5 GeV/c. Bayukov, Yu.D.; Gavrilov, V.B.; Goryainov, N.A. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Teoreticheskoj i Ehksperimental'noj Fiziki). 1982. 30p. (In Russian). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83703554.

The angular- and A dependences are measured for the inclusive cross sections of deuteron production following the reactions p+A → d+X at a 7.5 GeV/c initial momentum. The deuteron yield has been measured in the experiment for the 12 nuclei: Be, C, Al, Ta, Fe, Cu, Nb, Cd, Sn, Ta, Pb, V. For the C, Cu, Pb, V nuclei the angular dependence of the deuteron yield inclusive cross sections has been measured more thoroughly. To investigate the deuteron production mechanism, their spectra have been compared with the proton- or neutron spectra measured under the same conditions. The data have been analyzed in detail in the framework of attachment- and pickup models.

55184 (JINR—E-1-82-285) Study of the incident pion deflection in passing through atomic nucleus. Strugalski, Z.; Pawlak, T.; Pluta, J. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1982. 6p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702952.

Pion-xenon nucleus collision events at 3.5 GeV/c momentum are studied in which the incident pion is deflected only, without particle production; the deflection is accompanied by emission of nucleons. The multiplicity of the protons emitted is a measure of the nuclear matter layer thickness passed by the pion. It can be concluded that: a) a definite simple relation exists between the pion deflection angle and the thickness of the nuclear matter layer traversed by this pion; b) the deflection angle of the incident pion increases in a definite manner with increasing the thickness of the nuclear matter layer traversed by this pion; c) the average kinetic energy, average longitudinal momentum and average transverse momentum of the protons emitted do not depend on the pion deflection angle.

55185 (JINR—E-1-82-286) Neutral pion production in pion-xenon nucleus collisions at 3.5 GeV/c momentum. Strugalski, Z.; Peryt, W.; Niszcz, R.; Pluta, J. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1982. 14p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702953.

The investigation of the neutral pion production has been performed by means of the 180 xenon bubble chamber exposed in the beam of negatively charged pions of 3.5 GeV/c momentum. Various characteristics of the neutral pion production process are presented in dependence on the multiplicity of emitted protons. It can be concluded that: a) the neutral pion average multiplicity depends weakly on the multiplicity nsub(p) of emitted protons up to the proton multiplicity value nsub(p)=8; b) the neutral pion multiplicity distribution in the total set of events with any multiplicity nsub(p) of the emitted protons is almost the same as such distributions in the classes of events with nsub(p)=2, 3, 4, ...; c) the angular distribution of the neutral pions depends on the number of emitted protons.

55186 (JINR—R-3-82-224) Search for radiative capture of neutrons in nuclei stimulated by the electric field of a laser wave. Bechvarzh, F.; Zeman, P.; N'yuyan, N.D.; Popov, Yu.P.; Telezhnikov, S.A.; Kralik, M.; Kubechek, V. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics). 1982. 6p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702961.

The influence of an external variable electrical field on a "neutron+nucleus" system is investigated experimentally. The measurements were performed with ^{96}Mo and ^{127}I target-nuclei. No statistically reliable effect of such influence is discovered.

55187 (JINR—R-3-82-436) Differential neutron scattering cross sections and average neutron parameters of tin isotopes. Nikolenko, V.G.; Popov, A.B.; Samosvat, G.S. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics). 1982. 5p. (In Russian). (CONF-820942—33). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702964.

From Nuclear data for science and technology international conference; Antwerp, Belgium (6 Sep 1982).

Angular distributions of neutrons elastically scattered at 45 deg, 90 deg and 135 deg angles on the ^{116}Sn, ^{118}Sn, ^{120}Sn, ^{122}Sn, ^{124}Sn tin isotopes in the 1-200 keV energy range have been measured using the IBR-30 pulse reactor. Metal tin with the enrichment of 97-9 IBR-30 pulse reactor. Metal tin with the enrichment of 97-98 by the base isotope was used for the samples, with weights of 120-250 g. Measurements were carried out both under reactor (resolution of approximately 0.35 mcs/m) and booster (resolution of approximately 25 ns/m) operation conditions. The differential neutron scattering cross sections was described with the following formula: σ(theta)=σsub(s)/4π[1+ωsub(1)Psub(1)(costheta) +ωsub(2)Psub(2)(costheta)]. The cross section parameters obtained σsub(s)(E), ωsub(1)(E), ω_2(E) have been used to determine S^0, Ssub(1/2)sup(1), Ssub(3/2)sup(1), Rsub(0)sup(infinity), and Rsub(1)sup(infinity) strength functions and even-even tin isotope radii.

55188 (JINR—R-15-82-173) Study on the pion absorption by atomic nuclei by means of multilayer semiconductor spectrometer. Gornov, M.G.; Oganesyan, K.O.; Pechkurov, V.A.; Pichugin, A.P.; Porokhovoj, S.Yu.; Sergeev, F.M. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1982. 11p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702960.

A system of the JINR-MPEI multilayer semiconductor spectrometers which allow to obtain new results with a better energy resolution for the processes of negative pion capture in nuclei is described. The present state of experiment and theory of the pion capture phenomenon and its specific problems are considered with the aim of nuclear study. This problem include the searches and investigations of new light nuclei and nucleon resonances including pure neutron and proton nuclei and other exotic light nuclei. The searches of real pion bound states in nuclei are also considered. The importance of the experiments with polarized nuclei is noted. It is stressed that pion capture is at the same time a subject of study and a tool for it.

55189 **(LA-UR—83-2355) Calculation of nuclear properties far from the line of β stability.** Krumlinde, J.; Moeller, P.; Nix, J.R. (Lund Univ. (Sweden); Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. 6p. (CONF-8306114—2). NTIS, PC A02/MF A01. Order Number DE83017321.

From Workshop on nuclear astrophysics; Bad Wiessee, F.R. Germany (6 Jun 1983).

For a theoretical study of the decay from the r-process line to the line of β stability many nuclear properties must be known or modelled. We have, for instance, calculated nuclear potential-energy surfaces, ground-state masses and shapes by use of a Yukawa-plus-exponential macroscopic model and a folded-Yukawa single-particle potential for 4023 nuclei ranging from ^{16}O to ^{279}112. Here we show calculated and experimental single particle corrections and the deviation between calculated and experimental masses for 1323 nuclei for which the error in the experimental data was less than 1 MeV. Particularly noteworthy is that there seems to be no systematic increase in the deviation between calculated and experimental points as you go far from stability, a desirable feature of a mass formula that is to be used for nuclei out to the r-process line. To give specific numbers for a very neutron-rich nucleus we select ^{99}Rb for which the mass excess -50.60 MeV has recently been measured. The present mass formula gives -51.66 MeV for this nucleus, a 1.06 MeV error, whereas the droplet model predicts this mass excess to be -56.10 MeV, a 5.5 MeV error. (WHK)

55190 **(PB—83-223982) Perspectives in high energy nuclear collisions.** Rafelski, J.; Danos, M. (National Bureau of Standards, Washington, DC (USA)). Jun 1983. 85p. (NBSIR—83-2725). NTIS, PC A05/MF A01.

This report has been prepared as a working document for the conception of a research facility devoted to the study of high energy nuclear collisions. Different aspects of hadronic physics to be studied in nuclear collisions are selected, with emphasis placed on the properties and nature of the quark-gluon plasma, the formation of the plasma state in the central region and its anticipated lifetime, and the observability and strangeness content of this new form of nuclear matter.

55191 **γ-ray emission probability for the decay of ^{143}Ce.** Gehrke, R.J. (EG & G Idaho, Inc., Idaho Falls). *International Journal of Applied Radiation and Isotopes;* 33: 355-358(1982). Contract AC07-76ID01570.

The emission probabilities of the 57- and 293-keV γ-rays emitted in the decay of 33.0-h ^{143}Ce have been measured by 4π β-γ coincidence counting and Ge(Li) spectrometric techniques to be (12.3 +/- 0.3) and (42.8 +/- 0.4) γ-rays per 100 decays, respectively. The relative intensities for 13 other γ-rays emitted in the decay of ^{143}Ce have also been measured.

6518 Nuclear Properties And Reactions, A=150-189

REFER ALSO TO CITATION(S) 55179

55192 **Evolution of nuclear shapes in $^{157-161}$Yb as a function of spin and neutron number.** Jaeaeskelaeinen, M.; Sarantites, D.G.; Dilmanian, F.A.; Woodward, R.; Puchta, H. (Washington Univ., St. Louis, MO (USA). Dept. of Chemistry); Beene, J.R.; Hattula, J.; Halbert, M.L.; Hensley, D.C.; Barker, J.H. (Oak Ridge National Lab., TN (USA)). *Nuclear Physics [Section] A;* 396: 319c-328c(21 Mar 1983). (CONF-820828—).

From 9. EPS Nuclear Physics Divisional conference on nuclear structure; Amsterdam, Netherlands (29 Aug 1982).

The population distributions of the entry states, the entry lines $<E^*>$ versus multiplicity, the energy spectra and the angular distributions of the continuum γ-rays as a function of multiplicity in $^{157-161}$Yb from the reactions of 136 MeV and 149 MeV ^{20}Ne with ^{144}Nd and ^{146}Nd have been investigated with a 4π multidetector system gated with a Ge detector. The observed entry lines and γ-decay modes indicate changes in the nuclear structure with increasing spin. This systematic change for N = 87 - 91 Yb isotopes suggests an evolution of nuclear shapes from prolate at low spins to particle aligned oblate structure for ^{157}Yb and ^{159}Yb followed by the onset of high-K bands built on largely deformed oblate states at increasingly higher spin between 38 and 50 ($h/2\pi$) with increasing neutron number for $^{157-161}$Yb. Furthermore evidence for an evolution to triaxial shape at I approx.= 50 for ^{158}Yb was found.

6519 Nuclear Properties And Reactions, A=190-219

REFER ALSO TO CITATION(S) 55183

55193 (CEA-N—2296, pp 149-151) **One - and non-coplanar two - particle inclusive cross-sections from the ^{4}He + Pb reaction at 150 MeV/nucleon.** Chamcham, K.; Bedjidian, M.; Descroix, E. (Institut de Physique Nucleaire, Villeurbanne (France)) (and others). May 1982. NTIS (US Sales Only), PC A08/MF A01. (CONF-820536—).

From International conference on selected heavy ion reactions; Saclay, France (3 May 1982).

Double differential cross-sections of x-fragment emission (p, d, t, ^{3}He, ^{4}He) from ^{4}He + Pb reaction at 150 MeV/nucleon have been measured at the Laboratoire National Saturne.

55194 **(LBL—16451) Search for flow in the reaction Ar + Pb.** Renfordt, R.E.; Brockmann, R.; Harris, J.W.; Maier, M.; Riess, F.; Sandoval, A.; Stock, R.; Stroebele, H.; Wolf, K.L.; Pugh, H.G. (Lawrence Berkeley Lab., CA (USA); Heidelberg Univ. (Germany, F.R.); Gesellschaft fuer Schwerionenforschung m.b.H., Darmstadt (Germany, F.R.)). Aug 1983. Contract AC03-76SF00098. 8p. NTIS, PC A02/MF A01. Order Number DE83017740.

Portions are illegible in microfiche products.

Interactions between Ar projectiles and lead are studied in terms of global observables. The Streamer Chamber at the Berkeley BEVALAC was used to record all charged particles produced in collisions between 0.8 GeV/u Ar projectiles with a Pb_3O_4 target. A hardware trigger selected central collisions with Pb nuclei corresponding to a trigger cross section of 1 barn. In a geometrical picture this is equivalent to an impact parameter range of 0 to 5 fm.

6520 Nuclear Properties And Reactions, A=220 And Above

REFER ALSO TO CITATION(S) 55175, 55179, 55180

55195 **(INDC(NDS)—138/GE) Fifth research coordination meeting on the measurement and evaluation of transactinium isotope nuclear data. Central Bureau for Nuclear Measurements, Geel, Belgium, 1-3 September 1982. Summary report.** Lorenz, A. (International Atomic Energy Agency, Vienna (Austria). International Nuclear Data Committee). Dec 1982. 53p. (CONF-820963—Summ). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83703552.

From 5. coordinated research meeting on measurement and evaluation of transactinium isotope nuclear data; Geel, Belgium (1 Sep 1982).

Proceedings of the fifth meeting of the participants in the IAEA Coordinated Research Programme to measure and evaluate the required nuclear decay data of heavy element radionuclides, convened by the IAEA Nuclear Data Section on 1-3 September 1982 at CBNM, Geel, Belgium. The meeting participants reviewed the data requirements, updated and extended the recommended list of half-lives, and continued to review the status of alpha and

gamma radiation spectra emitted in the decay of transactinium isotopes.

55196 **(NIIAR—42(495)) Analysis of americium and curium resonance parameters.** Belanova, T.S.; Kolesov, A.G. (Nauchno-Issledovatel'skij Inst. Atomnykh Reaktorov, Dimitrovgrad (USSR)). 1981. 22p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703556.

An analysis of works on measuring the total neutron and partial cross sections in the resonance energy range for the isotopes sup(241, 243)Am and sup(242-248)Cm is presented. The following statistical parameters are calculated: the average distance between the energy levels, the average partial level widths, the strength functions for the isotopes sup(241, 243)Am and sup(242-248)Cm, and some regularities in their behaviour are analyzed. The data on spins for the sup(241, 243)Am and ^{248}Cm energy levels in the region of neutron energies under consideration not being available, it is difficult to interpret the revealed discrepancies between the theoretical and experimental distributions of the distances in between the energy levels observed. It is found that for the isotopes sup(242, 243, 247, 248)Cm the experimental data available (both regarding the number of levels and the quality of measuring their parameters) are not yet reliable for performing statistical analysis and computation of average parameters. Further measurements are required of both total and partial neutron cross sections for the curium isotopes in a wide energy range with the use of practically monoisotopic samples of high chemical purity. The average radiation widths for the sup(242, 244, 246,248)Cm confirm a theoretical statement to the effect that with the even isotopes of curium the quantity $< GITA_{sub(\gamma)} >$ decreases with the nucleus mass growth.

6530 Nuclear Theory

REFER ALSO TO CITATION(S) 55145, 55152

55197 **(CEA-CONF—6604) Use of a transport equation for the dynamical behaviour of the nuclear fission.** Scheuter, F.; Gregoire, C. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). Nov 1982. 8p. (CONF-821197—1). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703547.

From 12. international symposium on nuclear physics; Dresden, German D.R. (22 Nov 1982).

A Fokker PLanck equation is used for the problem of nuclear fission. The decay rate is computed within a three dimensional calculation and the influence of coupling terms in the transport coefficient tensors is considered. Initial conditions at the saddle point for the collective degrees of freedom are dynamically obtained in the stationary situation. Finally, dynamics of fluctuations from saddle to scission is treated under the same assumptions on the propagation.

55198 (CERN—83-02, pp 151-165) **Nuclear beams and targets.** Willis, W.J. (European Organization for Nuclear Research, Geneva (Switzerland)). 10 Feb 1983. NTIS (US Sales Only), PC A10/MF A01. (CONF-831216—Vol.1).

From Workshop on SPS fixed-target physics in the years 1984-1989; Geneva, Switzerland (6 Dec 1983).

The author discusses the energy losses in deep inelastic heavy ion reactions in the framework of the quark picture of nuclear matter..

55199 **(INDC(CCP)—184/L) Evaluation of the (n,2n) and (n,3n) cross-sections for heavy nuclei with allowance for non-equilibrium processes.** Bychkov, V.M.; Plyaskin, V.I.; Toshinskaya, Eh.F. (International Atomic Energy Agency, Vienna (Austria). International Nuclear Data Committee). Aug 1982. 20p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703549.

In the present paper, we use a theoretical method for evaluating the (n,2n) and (n,3n) excitation functions, based on simplified versions of the statistical and exciton models. With this method it is quite simple to calculate absolute cross-section values for nuclei with relative atomic masses A > or approx. 100 without adjustment to experimental data for the (n,2n) and (n,3n) reactions. The method is used to evaluate the excitation functions of the given reactions in 20 fissile isotopes. Comparison is made with the results of other evaluations and it is shown to be important to allow for non-equilibrium processes in the neutron channel.

55200 **Workshop on the derivation of average resonance parameters, 15-16 Oct 1981, Saclay (France).** Moore, M. (Los Alamos National Laboratory, NM (USA)). *Newsletter NEA Data Bank;* No. 27, 1-23(Jul 1982).

The programs compared in this report are all designed to calculate average resonance parameters from experimentally derived resonance width data. The present exercice was suggested by the significant differences observed between the average resonance parameters calculated by different laboratories using different codes but the same experimental data. These first results were surprisingly bad.

6540 Radiation And Shielding Physics

REFER ALSO TO CITATION(S) 53730, 53732

55201 **(AD-A—126753/3) Cerenkov radiation. Master's thesis.** Saglam, A. (Naval Postgraduate School, Monterey, CA (USA)). Dec 1982. 70p. NTIS, PC A04/MF A01.

Cerenkov radiation is calculated for electron beams which exceed the velocity of radiation in a nondispersive dielectric medium. The electron beam is assumed to be bunched as emitted from a travelling wave accelerator, and the emission region is assumed to be finite. Predictions include (a) emission at harmonics of the bunch rate, (b) coherence of radiation at low frequencies, (c) smearing of the emission angle for finite emission regions, (d) explicit evaluation of power spectrum in terms of bunch dimensions. The results of theory are applied to microwave emission form fast electrons in air for different lengths of the air path. Problems encountered during the experiment are discussed and suggestions for continuing work are provided.

55202 **(IAEA-R—2226-F) Research within the coordinated programme on neutron scattering techniques in applied research. Final report for the period 1 October 1978 - 31 December 1981.** Satya Murthy, N.S. (International Atomic Energy Agency, Vienna (Austria)). Feb 1982. 91p. NTIS (US Sales Only), PC A05/MF A01. Order Number DE83703539.

This paper reviews developments of neutron scattering studies at Bhabha Atomic Research Centre (BARC) over the past two decades through utilisation of Apsara and Circus reactor facilities. Salient results in neutron crystallography, magnetic diffraction and inelastic neutron scattering will be presented highlighting progressive involvement in more and more complex studies. The growth of non-neutronic activities as a natural outcome of overall necessity and interest of investigators will be indicated. A description of facilities planned at R5 and the nature of studies that are likely to be taken up at R5 will be briefly discussed.

55203 **(IC—82/100) Treatment of Cerenkov radiation from electric and magnetic charges in dispersive and dissipative media.** Saffouri, M.H. (International Centre for Theoretical Physics, Trieste (Italy)). Jul 1982. 62p. NTIS (US Sales Only), PC A04/MF A01. Order Number DE83703545.

A rigorous treatment of the problem of Cerenkov radiation from fast moving electric and magnetic charges is presented. This is based on the rigorous solution of Maxwell's equations in a general dispersive medium possessing dielectric and magnetic properties and with, and without, dissipation. It is shown that the fields are completely determined by one scalar function. Expressions for the exact fields are obtained. From the asymptotic fields all the relevant properties of Cerenkov radiation are reproduced. In particular, it is shown that in the absence of dissipation the energy in each mode travels with the phase velocity of that mode. For a dissipative medium the electric field develops a longitudinal component and the energy propagates at an angle to the phase velocity. Appli-

cation to the case of a Tachyon shows that it must emit Cerenkov radiation in vacuum. An estimate is given for the resulting linear density of emitted radiation. Finally, two suggestions are made for the experimental detection of magnetic charges and electric dipole moments of elementary particles based upon the Cerenkov radiation which they would emit in dispersive media.

55204 (IC—82/149) **Particle transfer in multiregion.** El Wakil, S.A.; Atia, M.T.; Saad, E.A.; Hendi, A. (International Centre for Theoretical Physics, Trieste (Italy)). Aug 1982. 13p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703546.

Asymptotic calculations for reflection and transmission coefficients for particle incident on an inhomogeneous plane parallel medium are performed. The medium is assumed to consist of several different optically thick homogeneous layers. Functional relations between the reflection and transmission coefficients for the sublayers are obtained. The invariant embedding concepts are used to calculate the albedo for sub-layers. Numerical calculations and comparisons are performed.

55205 **X-rays from synchrotron: A new challenge for neutron scattering.** Shirane, G. (Brookhaven National Lab., Upton, NY (USA)). *Physica B+C (Amsterdam);* **120**: No. 1-3, 108-113(May 1983). (CONF-8208155—).

From Yamada conference on neutron scattering in condensed matter; Hakone, Japan (31 Aug 1982).

A brief review is given of current developments in X-ray scattering techniques at synchrotron radiation facilities. Highly collimated, intense sources of white radiation open up new areas of research in condensed matter physics and challenge the traditional domains of neutron scattering. These include energy dispersive scattering, the use of anomalous dispersion, magnetic diffraction and direct energy analysis by backscattering. The relative merits of X-ray and neutron scattering techniques will be discussed. The unique advantage of neutron scattering is the capability of performing polarization analysis. We will discuss in some detail the current developments at Brookhaven inelastic scattering of polarized neutrons. In addition, we will also discuss special technical problems associated with the search for phasons utilizing a high-resolution triple axis spectrometer.

55206 **Monte Carlo calculations of initial energies of electrons in water irradiated by photons with energies up to 1 GeV.** Todo, A.S.; Hiromoto, G.; Turner, J.E.; Hamm, R.N.; Wright, H.A. (Oak Ridge National Lab., TN (USA)). *Health Physics;* **43**: No. 6, 845-852(Dec 1982).

Previous calculations of the initial energies of electrons produced in water irradiated by photons are extended to 1 GeV by including pair and triplet production. Calculations were performed with the Monte Carlo computer code PHOEL-3, which replaces the earlier code, PHOEL-2. Tables of initial electron energies are presented for single interactions of monoenergetic photons at a number of energies from 10 keV to 1 GeV. These tables can be used to compute kerma in water irradiated by photons with arbitrary energy spectra to 1 GeV. In addition, separate tables of Compton- and pair-electron spectra are given over this energy range. The code PHOEL-3 is available from the Radiation Shielding Information Center, Oak Ridge National Laboratory, Oak Ridge, TN 37830.

6550 Medical Physics

REFER ALSO TO CITATION(S) 54345, 54606, 55000, 55017, 55062

55207 (ARL/TR—050, pp 41-43) **Energy spectra of secondary neutrons produced by high energy bremsstrahlung in carbon, nitrogen, oxygen and tissue.** Allen, P.D.; Chaudhri, M.A. Jan 1983. NTIS (US Sales Only), PC A08/MF A01.

In Annual review of research projects 1981.

Neutron energy spectra in carbon, nitrogen and oxygen were calculated for various bremsstrahlung end-point energies and, from these, tissue spectra were calculated using the tissue equivalent molecular formula $C_5H_{40}O_{18}N$. The method involves folding the known bremsstrahlung spectrum shape with the cross section for each possible decay mode in each element which leads to neutron production. The partial photoneutron cross sections used have been derived from published data.

55208 (ARL/TR—050, pp 51-55) **Determination of factors for the conversion of exposure to absorbed dose to water for x-rays less than 150 kV.** Hargrave, N.J.; Morris, N.D.; Letwin, H.M. Jan 1983. NTIS (US Sales Only), PC A08/MF A01.

In Annual review of research projects 1981.

An experimental determination of the displacement factor for x rays is reported. This correction is needed to convert exposure to absorbed dose. Detailed measurements were made for a beam of 100 kV and 2mm Al added filtration using an SP140 superficial therapy x-ray unit with the water phantom at 50.0cm SSD. A field size of 6.5cm x 6.5cm on the entrance surface of the phantom was obtained.

55209 (ARL/TR—050, pp 62-64) **Multiplying factors used for the calculation of effective dose equivalent.** Morris, N.D. Jan 1983. NTIS (US Sales Only), PC A08/MF A01.

In Annual review of research projects 1981.

Evaluation of the effective whole body dose equivalent requires the calculation of the absorbed dose to several organs and the application of appropriate weighting factors to these doses. The calculation was performed for gonads, breast, red bone marrow, lung, thyroid, bone surfaces, stomach, intestine and liver.

55210 (ARL/TR—050, pp 108-110) **Preparation of ultra-thin sources and calibration standards for coincident studies, at high resolution, of radiations emitted by the heavy elements.** Moroney, J.R.; Burns, P.A.; Johnston, P.N. Jan 1983. NTIS (US Sales Only), PC A08/MF A01.

In Annual review of research projects 1981.

Precipitation and electrodeposition are discussed as methods of preparing thin sources. The sources produced by electrodeposition fulfil all of the requirements stipulated for (α, Lx) studies of uranium and transuranic elements. However, where the most stable form of the radionuclide in solution is an anion, precipitation could become the preferred technique of source preparation.

55211 (MS—5.8-1974) **Specification for symbol for ionizing radiation.** (Standards Institution of Malaysia, Kuala Lumpur). 1974. 8p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703563.

This Malaysia Standard specification specifies a symbol recommended for use only to signify the actual or potential presence of ionizing radiation (γ, α, β only) and to identify objects, devices, materials or combinations of materials which emit such radiation.

55212 (NUREG/CR—3399) **Experimental verification of the neutron spectrum from the NBS D_2O-moderated ^{252}Cf source.** Schwartz, R.B.; Eisenhauer, C.M.; Grundl, J.A. (National Bureau of Standards, Washington, DC (USA)). Aug 1983. 36p. NTIS, PC A03/MF A01 - GPO $3.75. Order Number DE83910891.

Portions are illegible in microfiche products.

We have experimentally verified the spectrum calculated for a ^{252}Cf neutron source moderated by a D_2O sphere of 15 cm radius. Using NBS double fission chambers as threshold detectors, we find excellent agreement between our measurements and results derived from the calculated spectrum in the energy range below ~ 10 keV. Although the measurements suggest the existence of small, but significant, discrepancies above ~ 600 keV, the value of the fluence-to-dose equivalent conversion factor derived from our measurements agrees with that derived from the calculated spectrum (9.0×10^{-8} mrem cm^2) to within 2%, with an estimated uncertainty of +- 4%. 15 references, 10 figures, 8 tables.

55213 (PINSTECH/HPD—101) **Code of practice against radiation hazards at PINSTECH.** Mubarak, M.A.; Javed, M.; Ahmad, S. (Pakistan Inst. of Nuclear Science and Technology, Islamabad. Health Physics Div.). Oct 1982. 43p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83702976.

It is the radiation safety policy of PAEC/PINSTECH that all radiation exposure should be kept as low as reasonably achievable (ALARA). A code of practice against radiation hazards at PINSTECH was written in 1972 which regulated the conduct of radiation work at PINSTECH. Since the radiation work at PINSTECH has greatly increased, it was considered necessary to revise the code so as to incorporate the new concepts in this field as well as to help meet the present requirements of radiation protection. The procedures set forth in this code are mandatory and in no case should any of them be deviated except under an emergency situation which may be handled according to procedures laid down in a separate manual "Emergency Procedures at PARR-PINSTECH" (PINSTECH/HP--19). All those supervising or performing any kind of radiation work are required to study and adhere to these procedures. Copy of this code should be kept in every radiation laboratory for ready reference.

55214 **(TU-Inf—05-15-80) Calibration of a special emergency neutron dosemeter based on organic solid-state track detectors.** Gruellich, A.; Doerschel, B.; Streubel, G.; Schuricht, V. (Technische Univ., Dresden (German Democratic Republic). Sektion Physik). 1980. 16p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703444.

The calibration of a neutron dosemeter for emergency use in different neutron fields is described. The dosemeter consists of cellulose triacetate foil partly covered with LiF for registering fast neutrons up to 20 MeV via recoil nuclei and alpha particles. Reading is performed by light transmission measurements. The calibration factors depend on the neutron spectra because all quantities influencing the sensitivity of the detector are functions of the neutron energy. Measurement range and achievable accuracy are discussed taking into account possible fields of application.

55215 **(Y/DD—317) Calibration and use of a lung-monitoring facility using sodium iodide detectors.** King, A.; Barclay, R.K. (Oak Ridge Y-12 Plant, TN (USA)). 1983. Contract W-7405-ENG-26. 21p. (CONF-830557—6). NTIS, PC A02/MF A01. Order Number DE83017552.

From ORNL workshop on calibration of actinide lung counters; Oak Ridge, TN, USA (10 May 1983).

The in-vivo radiation monitoring system at the Oak Ridge Y-12 Plant has been recalibated using realistic human phantoms manufactured under the direction of the Special Projects Division of the Hazards Control Department, Lawrence Livermore National Laboratory. The results of the system calibration indicate enhancement of the system accuracy and provide for an assessment of the system's precision. A plant control population provides statistical data for estimation of system precision, and the Critical, Detection and Determination Levels for two types of uranium.

55216 **Representative breast size of reference female and reply.** Cristy, M. (Oak Ridge National Lab., TN (USA)); Kramer, R.; Williams, G.; Drexler, G. (Gesellschaft fuer Strahlen- und Umweltforschung m.b.H. Muenchen, Neuherberg (Germany, F.R.). Inst. fuer Strahlenschutz). *Health Physics;* **43**: No. 6, 930-935(Dec 1982).

Cristy disagrees with Kramer and Drexler on the representative breast size of a reference adult female - and after reviewing the literature suggests a representative size of 190-200 ml for one breast in a young adult female. Kramer and Drexler reply that after carrying out a series of Monte Carlo calculations on a mathematical MIRD-5 phantom, exposed to external photon irradiation, to discover the influence of breast-size on dose equivalents to the breast a representative size of (260-270)cm^3 and weight of (250-265)gm per breast is more appropriate, taking all data into account.

6560 Solid State Physics

REFER ALSO TO CITATION(S) 53730, 54307

55217 **(BNL—33493) Universality and fractal dimension of mode locking structure in systems with competing periodicities.** Bak, P. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 11p. (CONF-830796—1). NTIS, PC A02/MF A01. Order Number DE83017352.

From Workshop on statics and dynamics of nonlinear systems; Erice, Italy (1 Jul 1983).

Portions are illegible in microfiche products.

We are concerned with the properties of physical systems with competing periodicities. Two very different situations are considered. In the first case the competition is between two periods in time, or two frequencies, in a system which is at the verge of entering into a chaotic state. In the second case the competition is between two periods in space. In both cases there is a nonlinear coupling which tend to lock the two periods together. An example of a system of the first type is a driven damped pendulum perturbed by an external oscillating force. In the absence of the periodic force the pendulum will oscillate, or rotate with a frequency of its own. If the coupling is weak the frequencies will lock only if the unperturbed frequencies are related to each other through almost rational numbers. If the coupling is stronger there will be an increased tendence towards locking. At some critical strength the modes may always be locked so that the resulting frequency is always a rational fraction of the frequency of the external perturbation. If the coupling is even stronger the motion may become chaotic, with no single basic frequency. In the second case one has a competition between the period, or wave vector of the spatially ordered structure, such as a spin-density wave, and the periodicity of the lattice on which the system is defined. A specific model of this type is the axial next-nearest-neighbor Ising (ANNNI) model. For some values of the parameters the magnetic structure has a period of its own, not related to the periodicity of the underlying lattice. In other regimes of the phase diagram, where the effective coupling is stronger, the resulting structure is always commensurable with the lattice. As a specific example we consider a simple one-dimensional Ising model with long range antiferromagnetic interactions.

55218 **(IS-M—435) New developments and opportunities for NMR in metal-hydrogen systems.** Barnes, R.G. (Ames Lab., IA (USA)). 1983. Contract W-7405-ENG-82. 3p. (CONF-8309136—1). NTIS, PC A02/MF A01. Order Number DE83017696.

From Hydrogen in metals international meeting; Wroclaw, Poland (20 Sep 1983).

Nuclear magnetic resonance (NMR) methods continue to make strong contributions to understanding crystal structure and atom locations and electronic structure in metal-hydrogen systems, as well as the changes that occur in these properties at structural and electronic phase transitions. NMR methods also afford an almost uniquely powerful approach to the study of hydrogen motion (diffusion). In this brief survey some recent developments in experimental methods and in types of systems studied are reviewed, and the consequences and opportunities for further investigation which these developments afford are outlined. (WHK)

6561 Superconductivity

REFER ALSO TO CITATION(S) 54206, 54270, 54273, 54288

55219 **(AD-A—128876/0) I-V curves of superconducting microconstrictions. Technical report.** Blonder, G.E. (Harvard Univ., Cambridge, MA (USA). Div. of Applied Sciences). Sep 1982. 156p. (TR—19). NTIS, PC A08/MF A01.

In recent years there has been much experimental and theoretical work on small-area high-current-density superconducting junctions, since such junctions have advantages for certain practical applications. Although the I-V curve properties of classic (high barrier) tunnel junctions have long been understood in great detail, the properties of metallic (no barrier) junctions have been studied

only more recently and in less detail, and the transitional case (small barrier) has received practically no attention at all. Here the authors present a new unified treatment which is sufficiently general to embrace both limits, as well as the intermediate regime. In this work, they confine their attention primarily to the N-S interface within the context of a genralized Andreev reflection model. This avoids the complications of the Josephson effect, while allowing for the complete delineation of the I-V curves including the so-called excess current at high voltages, as it increases from zero in tunnel junctions to its limiting value in clean metallic contacts. In addition, by suitably joining two N-S interfaces together as a model for the S-S interface, the authors have discovered a physically plausible explanation for the subharmonic energy gap structure that has been observed in the I-V curves of a wide variety of microconstrictions.

55220 **(AD-A—129600/3) Transient heat transfer in coated superconductors. Final scientific report 1 Jun 81-1 Sep 82.** Menard, A.R. (Saginaw Valley State Coll., University Center, MI (USA). Dept. of Physics). 29 Oct 1982. 54p. (SP—80-10-112). NTIS, PC A04/MF A01.

Computer simulation of transient heat transfer from coated superconductors to liquid helium have revealed that coating a superconductor with certain new materials, called Laketites, instead of traditional insulation, such as GE7031, substantially improves the ability of the superconductor to withstand transient heat pulses without making the transition to the normal i.e. non-superconducting state. In the best cases, the length of time that constant heating can be withstood is improved twenty fold. This report shows that the most important property of these new materials is their increased thermal conductivity relative to current materials. The highest thermal conductivity materials designed SC-2, SC-3 are the most desirable for further research and development. The increased specific heat of the Laketites is desirable, but not crucial. Furthermore, the thickness of the coating has little effect on the improved ability of the superconductor to withstand heat pulses. This report recommends a vigorous program of further development of the Laketites. A complete theoretical background of the computer simulation and examples of the programs used are also included in this report.

6570 Theoretical Physics

55221 **(DOE/ET/29196—T1) Efficient technique for calculating multiple solutions of electric-field problems. Part I. Final report.** Lauber, T.S. (Rensselaer Polytechnic Inst., Troy, NY (USA)). Dec 1980. Contract AS01-77ET29196. 158p. NTIS, PC A08/MF A01. Order Number DE83017479.

Portions are illegible in microfiche products.

The purpose of this report is to present a digital computer program capable of calculating the electrostatic field in an arbitrary two-dimensional configuration. The program was developed as a preliminary result in a project aimed at producing a three-dimensional program. Thus, this report represents an interim report on the entire project.

55222 **(DOE/ET/29196—T2) Efficient technique for calculating multiple solutions of electric-field problems. Part II. Corrections and modifications of the WINDOW program. Final report.** Theodossiou, G.G.; Lauber, T.S. (Rensselaer Polytechnic Inst., Troy, NY (USA)). May 1981. Contract AS01-77ET29196. 55p. NTIS, PC A04/MF A01. Order Number DE83017943.

Portions are illegible in microfiche products; Thesis. Submitted by G.G. Theodossiou.

The project work includes the correction of the various errors and incompatibilities between the program and the IBM system, the creation of a new graphics subroutine which was added to the program, and the preparation of a new detailed Operator's Manual. The purpose of this paper is to give a detailed report of the work that has been done for all three parts of the project.

55223 **(IS-M—434) Effects of dissipation in one-dimensional inverse problems.** Corones, J.P.; Davison, M.E.; Krueger, R.J. (Ames Lab., IA (USA); Nebraska Univ., Lincoln (USA). Dept. of Mathematics). 1983. Contract W-7405-ENG-82. 14p. (CONF-830420—5). NTIS, PC A02/MF A01. Order Number DE83017692.

From Society of Photo-Optical Instrumentation Engineers conference; Arlington, VA, USA (4 Apr 1983).

Consider the problem of determining the permittivity as a function of depth in a one-dimensional medium. If the incident field is a transverse electric plane wave then the permittivity can be determined by using the resulting reflected field in an appropriate inversion algorithm, assuming the conductivity of the medium is known. However, if the conductivity is only known approximately, use of such inversion techniques can result in erroneous estimates of the permittivity. In this paper we examine how the performance of an inversion algorithm is altered by misrepresenting the dissipative effects of the medium. Two cases are of interest: (1) The assumed dissipative effects differ slightly from the actual dissipative effects throughout the medium, e.g., assuming no dissipation in a medium which in fact has small, non-zero conductivity. (2) Ignoring conductivity in a narrow region of the medium.

55224 **(JINR—E-2-82-705) Quantum-mechanical oscillator with an arbitrary anharmonicity 1/N expansion and perturbation theory.** Koudinov, A.V.; Smondyrev, M.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). 1982. 16p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703535.

The properties of the 1/N-expansion for the N-dimensional anharmonic oscillator with the arbitrary power anharmonicity are investigated. The first six terms of the expansion for the energy of the ground and first excited states are obtained in an analytical form. The high-order behaviour of the 1/N-expansion is also studied. The formulae derived are used to find the exact analytical expressions for the first six coefficients of the standard perturbation theory in powers of the coupling constant in the case of the N-dimensional double-well potential. The high-order behaviour of these coefficients is discussed.

55225 **(JINR-R—2-82-721) Cubic approximation and local limitations to functional arbitraries in the general solution of Chew-Low equations.** Gerdt, V.P.; Zharkov, A.Yu. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation). 1982. 7p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703537.

The power series expansion elsewhere of the general solution of the Chew-Low equations suggested in another paper has been considered in the neighbourhood of the point w=0. It is shown that contrary to the quadratic approximation the cubic approximation does not possess the required Born pole in this point. In consequence of this the conclusion about invalidity of the considered expansion near the Born pole is made. Within the class of physically interesting solutions the local constraints $\beta(g)=0$ and C(0) not equal to 0 for arbitrary periodic functions determining the general solutions are obtained. By means of numerical analysis the value C(0) approximately -265 for the solutions possessing the Born pole is found.

55226 **(JINR-R—5-82-723) Sturm solutions of two-center problem in quantum mechanics.** Truskova, N.F. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation). 1982. 16p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703538.

An algorithm for a computer calculation of the Sturm solutions of the two-center problem in quantum mechanics at different values of the distance R between centers when the energy $E < 0$ corresponds to the term of the problem in view or to a constant is developed. Formulae of relationship between spherical and parabolic quantum numbers and asymptotics of the eigenvalues in $R \to 0$ and $R \to$ infinity are obtained. The results of calculations are presented in graphic form.

55227 **(PNL-SA—11167) Weighted nonparametric tail estimation procedures.** Carr, D.B.; Tolley, H.D. (Pacific Northwest Lab., Richland, WA (USA)). Sep 1983. Contract AC06-76RL01830. 47p. NTIS, PC A03/MF A01. Order Number DE83017870.

This paper investigates procedures for univariate nonparametric estimation of tail probabilities. Extrapolated values for tail probabilities beyond the data are also obtained based on the shape of the density in the tail. Several estimators which use exponential weighting are described. These are compared in a Monte Carlo study to nonweighted estimators, to the empirical cdf, to an integrated kernel, to a Fourier series estimate, to a penalized likelihood estimate and a maximum likelihood estimate. Selected weighted estimators are shown to compare favorably to many of these standard estimators for the sampling distributions investigated.

55228 **(SAND—83-1902C) Double porosity model for acoustic wave propagation in fractured-porous rock.** Wilson, R.K. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 9p. (CONF-830141—4). NTIS, PC A02/MF A01. Order Number DE83017823.

From Workshop on media with microstructure and wave propagation; Houghton, MI, USA (24 Jan 1983).

The propagation of acoustic waves in a fluid-saturated porous medium containing a continuously distributed system of fractures is modeled analytically. The porous medium is assumed to consist of two degrees of porosity and the resulting model thus yields three types of longitudinal waves, one associated with the elastic properties of the matrix material and one each for the fluids in the pore space and the fracture space. Two approaches are taken to develop the equations; one based on Biot's approach utilizing the viscodynamic operator and one based on the continuum theory of mixtures.

55229 **Quantum correspondence to classical chaos.** Heller, E.J. (Los Alamos National Lab., NM); Stechel, E.B. *Chemical Physics Letters;* **90**: No. 6, 484-485(20 Aug 1982).

This letter comments briefly on the question of time evolution of quantum systems with regular or irregular spectra.

6580 Mathematical Physics

REFER ALSO TO CITATION(S) 55227

55230 **(CEA-N—2310) Contribution to the minimization of time for the solution of algebraic differential equations system.** Michael, Samir. (Paris-11 Univ., 91 - Orsay (France); CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). Nov 1982. 141p. (In French). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83703474.

Thesis.

This note deals with the solution of large algebraic-differential systems involved in physical sciences specially in electronics and nuclear physics. The theoretical aspects for the stability of multistep methods is presented in detail. The stability condition is developed and we present our own conditions of stability. These conditions give rise to many new formulae that have very small truncation error. However for a real time simulation, it is necessary to obtain a very high computation speed. For this purpose, we have considered a multiprocessor machine and we have investigated the parallelization of the algorithm of generalized GEAR method. For a linear system, the method of GAUSS-JORDAN is used with some modifications. A new algorithm is presented for parallel matrix multiplication. This research work has been applied to the resolution of a system of equations corresponding to an experiment of gamma thermometry in a nuclear reactor (four thermometers in this case).

55231 **(MLM—3083(TR)) Dissertation in interpolation.** Caushy, A. Translated from *Journal de Mathematiques Pures et Appliquees ;* **2**: 193-205(20 Jul 1983). Contract AC04-76DP00053. 18p. NTIS, PC A02/MF A01. Order Number DE83015099.

Portions are illegible in microfiche products.

This translation presents the 1835 dissertation by Cauchy on his interpolation problem. (GHT)

55232 **(MLM—3084(TR)) Remarks on the differences that distinguish the interpolation of Cauchy from the least-squares method and which assure the priority of this method.** Bienayme, J. Translated from *Journal de Mathematiques Pures et Appliquees ;* **18**: 299-308(1853). Contract AC04-76DP00053. 13p. NTIS, PC A02/MF A01. Order Number DE83015092.

Portions are illegible in microfiche products.

This translation of the original document from 1853 discusses the Cauchy method and mentions that Cauchy proposed to correct, by method of least squares, the values determined by his calculation. The Cauchy interpolation is described as a modification of ordinary elimination between several equations of the first degree. (GHT)

70 FUSION ENERGY

7001 Plasma Research

REFER ALSO TO CITATION(S) 55254

55233 **(AD—875954/0) Summary of SHERWOOD activities.** Hulburt, C.W. (Defense Atomic Support Agency, Washington, DC (USA)). 10 Dec 1957. 32p. NTIS, PC A03/MF A01.

The report presents an extremely brief summary of SHERWOOD activities. It covers a minimum of background information necessary to understand the problems involved. This treatment does not do justice to the magnitude of the problems, which have, perhaps, been over simplified in the interests of brevity. Sketches and short explanations of the functioning of the various experimental devices have been included. The term SHERWOOD has been used somewhat broadly, in that projects relating to controlled thermonuclear reactions are included which, in the restricted sense, may not be a part of the program.

55234 **(AD-A—128922/2) Stabilizing effect of gas conductivity evolution on the resistive sausage mode of a propagating beam. Memorandum report.** Lampe, M.; Joyce, G. (Naval Research Lab., Washington, DC (USA)). 8 Jun 1983. 27p. (NRL-MR—5080). NTIS, PC A03/MF A01.

Previous theoretical work has shown that a highly current neutralized charged particle beam propagating in a pre-ionized plasma channel of fixed conductivity is subject to a resistive sausage instability. The authors show that the instability if stabilized, for the case of beam propagation into initially unionized gas, when the effect of beam-collisional ionization on the gas conductivity is modeled fully self-consistently.

55235 **(AD-A—129465/1) Charge-charge correlation functions in ultra dense plasmas. Memorandum report.** Cauble, R.; Boercker, D.B.; Kepple, P. (Naval Research Lab., Washington, DC (USA)). 22 Jun 1983. 26p. (NRL-MR—5104). NTIS, PC A03/MF A01.

The general kinetic equation of the charge-charge structure factor of a fully ionized strongly hydrogen plasma is solved in three distinct collision approximations. These structure factors are necessary for the complete description of spectral line profiles in hot dense plasma environments. Equilibrium correlation functions necessary to these solutions are provided by solution of the hypernetter chain integral equation in which an effective pair potential has been used to take into account short-range quantum effects. The results are compared with molecular dynamics simulations of the plasma using the effective pair potential and with a hierarchial approach involving known sum rules.

55236 **(CONF-820180—1) Review of the beta situation.** Sheffield, J. (Union Carbide Corp., Oak Ridge, TN (USA). Nuclear Div.). 18 Jan 1982. Contract W-7405-ENG-26. 24p. NTIS, PC A02/MF A01. Order Number DE83017182.

From Fusion power coordinating committee meeting; Los Angeles, CA, USA (27 Jan 1982).

Portions are illegible in microfiche products.

This note lists some of the possible causes of beta limitation in tokamak and discusses what is known and what is involved in investigating them. The motivation for preparing this note is the observed degradation of confinement with increasing beta poloidal β/sub p/ and beam power P/sub b/ in ISX-B.

55237 **(CONF-830406—104) Parametric study of LH current drive for FED-A.** Iida, H.; Ehst, D.A.; Peng, Y.K.M. (Oak Ridge National Lab., TN (USA); Japan Atomic Energy Research Inst., Tokai, Ibaraki; Argonne National Lab., IL (USA)). 1983. Contract W-7405-ENG-26. 6p. NTIS, PC A02/MF A01. Order Number DE83017178.

From 5. topical meeting on technology of fusion energy; Knoxville, TN, USA (26 Apr 1983).

Portions are illegible in microfiche products.

In the design of FED-A, quasi-steady state operation is conceived in which the plasma current is generated by the transformer coil in the burning phase and by the lower hybrid wave in the transformer-recharging phase. A parametric study was made to obtain optimum plasma and wave parameters in the recharging phase. The plasma current saturates when rf wave power increases. In order to avoid a hollow current distribution we should choose the rf power level which gives current saturation. The saturation current level is very sensitive to the width of the wave spectrum. The optimum plasma density and n/sub parallel/ should be determined so that the saturation current reaches to the required level and the efficiency is maximized for a given Δ n/sub parallel/.

55238 (CONF-830653—, pp 73-91) **Culham ECRH.** Riviere, A. (UKAEA, Oxfordshire, England). Jul 1983. NTIS MF A01.

From ECRH transmission systems workshop; Germantown, MD, USA (16 Jun 1983).

A brief review of experiments on TOSCA and CLEO is given. (MOW)

55239 **(CONF-8206219—1-Draft) Electron-ion collisions.** Crandall, D.H. (Oak Ridge National Lab., TN (USA)). 1982. Contract W-7405-ENG-26. 75p. NTIS, PC A04/MF A01. Order Number DE83017211.

From NATO Advanced Study Institute on the atomic physics of highly ionized atoms; Cargese, France (7 Jun 1982).

This discussion concentrates on basic physics aspects of inelastic processes of excitation, ionization, and recombination that occur during electron-ion collisions. Except for cases of illustration along isoelectronic sequences, only multicharged (at least +2) ions will be specifically discussed with some emphasis of unique physics aspects associated with ionic charge. The material presented will be discussed from a primarily experimental viewpoint with most attention to electron-ion interacting beams experiments.

55240 **(CONF-8305127—1) Effect of magnetic bending on the high-frequency stability of the ELMO Bumpy Torus.** El Nadi, A.M.; Whitson, J.C.; Kirolous, H.A.; Hassan, H.F. (Oak Ridge National Lab., TN (USA); Cairo Univ., Giza (Egypt). Dept. of Electrical Engineering). 1983. Contract W-7405-ENG-26. 7p. NTIS, PC A02/MF A01. Order Number DE83017177.

From Spring college on radiation in plasmas; Trieste, Italy (24 May 1983).

We have investigated the high frequency stability of the ELMO Bumpy Torus (EBT) device when the wave vector has a finite component along the magnetic field lines.

55241 **(DOE/ER/53104—6) Task II: ECRH and transport modeling in tandem mirrors and divertor physics. Annual progress report on fusion plasma theory, January 1, 1983-December 31, 1983.** Emmert, G.A. (Wisconsin Univ., Madison (USA). Dept. of Nuclear Engineering). Aug 1983. Contract AC02-80ER53104. 11p. NTIS, PC A02/MF A01. Order Number DE83017467.

The research performed under Task II of this contract has focused on (1) the coupling of an ECRH ray tracing and absorption code to a tandem mirror transport code in order to self-consistently model the temporal and spatial evolution of the plasma, and (2) the further development of a semi-analytical kinetic model for plasma flow in divertors and pumped limiters. Work on these topics is briefly summarized in this progress report.

55242 **(DOE/ER/53147—1) Technical progress report on the TFTR alpha extraction and measurement project.** Gerdin, G.A.; Wehring, B.W. (Illinois Univ., Urbana (USA). Nuclear Engineering Lab.). 1 Sep 1983. Contract AC02-83ER53147. 46p. NTIS, PC A03/MF A01. Order Number DE83018120.

A passive approach to the extraction and measurement of alpha particles from tokamak fusion reactors is analyzed; the construction and preliminary results of a fast data-acquisition system are described. The passive approach is the convertor foil concept whereby alphas leaving the plasma on large banana orbits strike carbon foils which slow down to around 0.5 MeV. At this energy a sizeable fraction of the alphas are neutral and hence can be analyzed by methods similar to those used in charge-exchange neutral detectors. Alpha loss orbits in TFTR, the thermal and particle flux to the foil on the TFTR edge, and the limitations in detector location caused by radiation are analyzed. The fast data-acquisition system operates in the pulse-height-analysis (PHA) mode to discriminate against low-energy background radiation. It consists of an alpha detector, a commercial preamplifier, a fast PHA module (built-in house) and an inexpensive microcomputer.

55243 **(DOE/ET/52040—T16) Velocity-space particle loss in field-reversed theta pinches.** Hsiao, M.Y. (Illinois Univ., Urbana (USA)). 1983. Contract AC02-76ET52040. 177p. NTIS, PC A09/MF A01. Order Number DE83017803.

Thesis.

A field-reversed theta pinch (FRTP) is a compact device for magnetic fusion. It has attracted much attention in recent years since encouraging experimental results have been obtained. However, the definite causes for the observed particle loss rate and plasma rotation are not well known. In this work, we study the velocity-space particle loss (VSPL), i.e., particle loss due to the existence of a loss region in velocity space, in FRTP's in order to have a better understanding about the characteristics of this device.

55244 **(DOE/ET/53043—6) Observations of soft x-ray fluctuations with an imaging array on TEXT.** Snipes, J.A.; Kochanski, T.P.; Kim, S.B. (Texas Univ., Austin (USA). Fusion Research Center). Aug 1983. Contract AC05-78ET53043. 43p. NTIS, PC A03/MF A01. Order Number DE83018118.

Portions are illegible in microfiche products.

Soft x-ray emissions from TEXT, a medium-sized ohmically heated tokamak, were measured using an array of 40 surface barrier diodes viewing the plasma through a narrow slit aperture. The level of soft x-ray emissions is found to correlate with electron temperature and density, plasma current, and Z effective. The time evolution of the soft x-ray signals is similar to that of the radiation from highly ionized heavy impurities, e.g., titanium and scandium. Typical signals rise with the increasing electron temperature as the current rises. The signals often exhibit sinusoidal oscillations simultaneously with the large MHD activity observed on the Mirnov coils. Sawtooth activity typically accompanies the quiescent phase of the discharge as MHD activity ceases and the plasma parameters become constant. Radial intensity profiles during normal sawtoothing are compared with those observed during the laser-driven ablation injections of scandium.

55245 **(PPPL—2020) Spectrum of resistive MHD modes in cylindrical plasmas.** Ryu, C.M.; Grimm, R.C. (Princeton Univ., NJ (USA). Plasma Physics Lab.). Jul 1983. Contract AC02-76CH03073. 62p. NTIS, PC A04/MF A01. Order Number DE83017985.

A numerical study of the normal modes of a compressible resistive MHD fluid in cylindrical geometry is presented. Resistivity resolves the shear Alfven and slow magnetosonic continua of ideal MHD into discrete spectra and gives rise to heavily damped modes whose frequencies lie on specific lines in the complex plane.

Fast magnetosonic waves are less affected but are also damped. Overstable modes arise from the shear Alfven spectrum. The stabilizing effect of favorable average curvature is shown. Eigenfunctions illustrating the nature of typical normal modes are displayed.

55246 **(PPPL—2021) Dielectronic satellite spectra of hydrogen-like titanium (Ti XXII).** Bitter, M.; von Goeler, S.; Cohen, S.; Hill, K.W.; Sesnic, S.; Tenney, F.; Timberlake, J.; Safronova, U.I.; Vainshtein, L.A.; Dubau, J. (Princeton Univ., NJ (USA). Plasma Physics Lab.). Jul 1983. Contract AC02-76CH03073. 52p. NTIS, PC A04/MF A01. Order Number DE83017984.

High resolution spectra of the Ly α_1 and Ly α_2 lines of hydrogenlike titanium, TiXXII, and the associated dielectronic satellites which are due to transitions 1snl-2pnl with n $\geq$ 2, have been observed from tokamak discharges with auxiliary ion cyclotron heating (ICRH) with central electron temperatures of 2 keV and central electron densities of 8 x 10^{13} cm^{-3} on the Princeton Large Torus (PLT). The data have been used for a detailed comparison with theoretical predictions based on the Z - expansion method and Hartree - Fock calculations. The results obtained with the Z - expansion method are in excellent agreement with the observed spectral data except for minor discrepancies between the theoretical and experimental wavelengths of 0.0003 A for the n = 2 satellites and of 0.0001 A for the separation of the Ly α_1 and Ly α_2 lines. Very good agreement with the experimental data is also obtained for the results from the Hartree - Fock calculations though somewhat larger discrepancies ($\simeq$ 0.0009 A) exist between experimental and theoretical wavelengths which are systematically too small. The observed spectra are used for diagnosis of the central ion and electron temperatures of the PLT discharges and for a measurement of the dielectronic recombination rate coefficient of TiXXII.

55247 **(UCRL—89286) TMX-U experimental results.** Simonen, T.C.; Allen, S.L.; Casper, T.A.; Clauser, J.F.; Clower, C.A.; Coensgen, F.H.; Correll, D.L.; Cummins, W.F.; Damm, C.C.; Failor, B.H. (Lawrence Livermore National Lab., CA (USA)). 31 Aug 1983. Contract W-7405-ENG-48. 24p. (CONF-830909—4). NTIS, PC A02/MF A01. Order Number DE83016790.

From Course and workshop on mirror-based and field-reversed approaches to magnetic fusion; Varenna, Italy (7 Sep 1983).

This paper describes results from the Tandem Mirror Experiment-Upgrade (TMX-U). Mirror-confined electrons with 30 to 70 keV mean energy densities of 0.5 to 2.0 x 10^{12} cm^{-3} and average betas of 3 to 5% are produced using electron-cyclotron resonant heating (ECRH). These results are consistent with an electron Fokker-Planck code. Improved ion-cyclotron microstability is observed using neutral beam injection at 47° to the magnetic axis, rather than at 90° as in the previous experiment, TMX. Strong end plugging has been produced using a combination of ECRH gyrotrons with sloshing-ion beam injection. In these low-density central cell experiments (3 x 10^{11} cm^{-3}) the axial losses (tau/sub parallel/ = 20 to 80 ms) are smaller than the nonambipolar radial losses (tau/sub perpendicular/ = 4 to 8 ms). Plugging has been achieved with a central cell density double that of the end plugs. Although no direct measurements are yet available to determine if a thermal barrier potential dip is generated, these experiments support many theoretical features of the thermal barrier concept.

55248 **(UCRL—89297) General ignition requirements in TMR's with drift pumping.** Logan, B.G. (Lawrence Livermore National Lab., CA (USA)). 1983. Contract W-7405-ENG-48. 24p. (CONF-830909—9). NTIS, PC A02/MF A01. Order Number DE83017196.

From Course and workshop on mirror-based and field-reversed approaches to magnetic fusion; Varenna, Italy (7 Sep 1983).

Portions are illegible in microfiche products.

Drift pumping of collisionally trapped DT ions and thermal alpha ash in the transitions and thermal barriers of TMR plugs can be shown by simple models to dominate the central cell energy losses, requiring in fact more radial ion loss by drift pumping than axial ion loss through the potential plugs, and setting a minimum central cell length for ignition. Induced electron transport due to drift pumping is shown to be small, so grids are not needed on the direct converter to separate ion and electron currents.

55249 **(UCRL—89767) Three-dimensional equilibrium in quadrupole symmetric tandem mirrors in the paraxial limit (reduced MHD).** Pearlstein, L.D. (Lawrence Livermore National Lab., CA (USA)). 29 Aug 1983. Contract W-7405-ENG-48. 19p. (CONF-830909—7). NTIS, PC A02/MF A01. Order Number DE83017840.

From Course and workshop on mirror-based and field-reversed approaches to magnetic fusion; Varenna, Italy (7 Sep 1983).

Equilibrium in quadrupole symmetric mirrors is fully three dimensional; however, because axial scale lengths are long compared with radial scale lengths (equivalently weak curvature) it is possible to reduce the complexity of the equations by expanding in the appropriate smallness parameter. Such a procedure leads to set of reduced MHD equations. The general theory will be presented, numerical results discussed, modifications due to finite Larmor radius will be added, and an analytic solution for sharp boundary pressure models will be developed.

55250 **(UCRL—89768) Ion microstability in tandem mirrors.** Pearlstein, L.D. (Lawrence Livermore National Lab., CA (USA)). 29 Aug 1983. Contract W-7405-ENG-48. 20p. (CONF-830909—6). NTIS, PC A02/MF A01. Order Number DE83017372.

From Course and workshop on mirror-based and field-reversed approaches to magnetic fusion; Varenna, Italy (7 Sep 1983).

The formalism describing ion-cyclotron modes in mirror traps will be developed. Emphasis will be placed on the effects of finite axial boundaries on the normal modes of the system. Wave properties are a composite picture of: positive energy waves (plasma oscillation, shear Alfven and drift waves), negative energy waves (ion Bernstein waves in a loss-cone media), positive dissipation (electron Landau damping, outgoing waves), and negative dissipation (ion cyclotron damping in a loss-cone and anisotropic temperature medium). Stability boundaries in this bounded media is affected by scale lengths along the magnetic field; first, because they determine the widths of the resonances, and second, because they restrict the parallel structure of the modes.

55251 **(UCRL—89771) Status of tandem-mirror confinement.** Baldwin, D.E. (Lawrence Livermore National Lab., CA (USA)). 30 Aug 1983. Contract W-7405-ENG-48. 12p. (CONF-830908—5). NTIS, PC A02/MF A01. Order Number DE83017369.

From 11. European conference on controlled fusion and plasma physics; Aachen, F.R. Germany (5 Sep 1983).

Portions are illegible in microfiche products.

Recent end-stopping experiments in TMX-Upgrade show strong plugging of the central cell by lower-density plugs, requiring both electron-cyclotron heating (ECRH) and 47° neutral-beam injection, consistent with the thermal-barrier concept. These experiments have low density (n < 10^{13} cm^{-3}) due to inefficient ECRH power coupling. Hot-ion and hot-electron buildup are consistent with Fokker-Planck calculations. No ion-cyclotron activity is observed in the plugs; occasional electron-cyclotron activity is observed. With plugging, axial lifetimes (tau/sub parallel/ > 40 ms) are larger than radial (tau/sub perpendicular/ = 5 to 10 ms) due to observed non-ambipolar ion transport. Recent tandem-mirror theoretical activities are also surveyed.

55252 **Plasma physics. Report on the 1982 international conference, Goeteborg, Sweden, 9-15 June 1982.** Post, R.F. (California Univ., Livermore (USA). Lawrence Livermore National Lab.). *Nuclear Fusion;* **23**: No. 5, 671-681(May 1983). (CONF-820618—).

From International conference on plasma physics; Goeteborg, Sweden (7 Jun 1982).

This paper reports on the joint session of the Fifth Kiev International Conference on Plasma Theory and the Fifth International Conference on Waves and Instabilities in Plasmas, held in Goeteborg, Sweden, 9-15 June 1982. The following topics were discussed: experimental and/or theoretical aspects of mainline approaches to fusion, e.g. the tokamak or the tandem mirror; alternative magnetic fusion concepts, such as the spheromak or the reversed-field pinch; and the next echelon of problems in magnetic fusion.

55253 **Plasma sweeper.** Motley, R.W.; Glanz, J. US Patent Application 6-436,558. 25 Oct 1982. 10p. Contract AC02-76CH03073.

A device is described for coupling RF power (a plasma sweeper) from RF power introducing means to a plasma having a magnetic field associated therewith comprises at least one electrode positioned near the plasma and near the RF power introducing means. Means are described for generating a static electric field at the electrode directed into the plasma and having a component substantially perpendicular to the plasma magnetic field such that a non-zero vector cross-product of the electric and magnetic fields exerts a force on the plasma causing the plasma to drift.

7002 Fusion Power Plant Technology

REFER ALSO TO CITATION(S) 53727, 54240, 54555, 54639

55254 **(AD-A—128254/0) Laser-plasma interaction experiments and diagnostics at NRL (Naval Research Laboratory). Memorandum report.** Ripin, B.H.; Grun, J.; Herbst, M.J.; Kacenjar, S.T.; McLean, E.A. (Naval Research Lab., Washington, DC (USA)). 11 May 1983. 31p. (NRL-MR—5078). NTIS, PC A03/MF A01.

Laser plasma interaction experiments have now advanced to the point where very quantitative measurements are required to elucidate the physic issues important for laser fusion and other applications. Detailed time-resolved knowledge of the plasma density, temperature, velocity gradients, spatial structure, heat flow characteristics, radiation emission, etc, are needed over tremendou ranges of plasma density and temperature. Moreover, the time scales are very short, aggrevating the difficulty of the measurements further. Nonetheless, such substantial progress has been made in diagnostic development during the past few years that we are now able to do well diagnosed experiments. In this paper the authors review recent diagnostic developments for laser-plasma interactions, outline their regimes of applicability, and show examples of their utility. In addition to diagnostics for the high densities and temperature characteristic of laser fusion physics studies, diagnostics designed to study the two-stream interactions of laser created plasma flowing through an ambient low density plasma will be described.

55255 **(AD-A—128759/8) Thermonuclear burn in cylindrical targets. Final report.** Buff, J.; Alme, M. (Mission Research Corp., Albuquerque, NM (USA)). May 1983. 53p. NTIS, PC A04/MF A01.

Thermonuclear burn in cylindrical targets imploded by fast plasma linear devices are considered. The benefits of limiting the thermal conduction and trapping the alpha particles as might be expected in the presence of a strong magnetic field are studies. It will be extremely difficult to achieve good thermonuclear burn in cylindrical targets with fast plasma liner devices. However, a large neutron flux (10 to the 15th power - 3 X 10 to the 16th power) can be achieved, which may be a powerful diagnostic in determining the quality of the plasma implosion.

55256 **(AD-A—129723/3) Prospects for optical probing of the Rayleigh-Taylor instability in ablatively-accelerated foil targets. Progress report.** Stamper, J.A.; Obenschain, S.P.; Ripin, B.H.; McLean, E.A.; Grun, J. (Naval Research Lab., Washington, DC (USA)). 21 Jun 1983. 15p. (NRL-MR—5093). NTIS, PC A02/MF A01.

Optical probing of non-uniformities is promising as a diagnostic of the Rayleigh-Taylor (R-T) instability. A study was made on an ablatively accelerated target which was designed to provide known initial conditions for the growth of the instability. Two diagnostic techniques were simultaneously used. A side-on, dark-field shadowgram (third harmonic) showed periodic structure in the steep-gradient region on the rear side of the accelerating target. The angular scatter pattern (second harmonic probe) from the front side was consistent with an expected periodic structure in the high-density region.

55257 **(AD-A—129774/6) Experimental methods for studying the Rayleigh-Taylor instability of ablatively accelerated targets. Memorandum report.** Grun, J.; Emery, M.H.; Herbst, M.J.; McLean, E.A.; Obenschain, S.P. (Naval Research Lab., Washington, DC (USA)). 17 Jun 1983. 32p. (NRL-MR—4896). NTIS, PC A03/MF A01.

The authors describe new diagnostic methods for the study of hydrodynamic instabilities in ablatively accelerated targets. These methods include face-on x-ray backlighting that does not require a backlighting laser beam (for growth rate measurement), and a tracer dot technique (for tracking ablation plasma flow). The targets in the experiments are periodically perturbed to provide initial conditions for the growth of the Rayleigh-Taylor instability.

55258 **(AD-A—129785/2) Stimulated Brillouin backscatter in long scale length plasmas. Memorandum report.** Colombant, D.G.; Manheimer, W.M.; Gardner, J.H. (Naval Research Lab., Washington, DC (USA)). 24 Jun 1983. 31p. (NRL-MR—5118). NTIS, PC A03/MF A01.

Stimulated Brillouin backscatter in long scale length plasmas is calculated using a wave kinetic model. These calculations make use of computer hydrodynamic profiles for these plasmas. Results are presented for the parameters of the joint NRL- LLNL experiments and for reactor size pellets of 5 mm characteristic length. Means of reducing high levels of backscatter for the latter case are investigated.

55259 **(CEA-CONF—6581) Damage threshold measurements at 1.06 μm at Centre d'Etudes de Limeil.** Friart, D.; Novaro, M.; Garaude, F. (CEA Centre d'Etudes de Limeil, 94 - Villeneuve-Saint-Georges (France)). Nov 1982. 4p. (CONF-821170—5). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703542.

From Conference on laser induced damage in optical materials; Boulder, CO, USA (15 Nov 1982).

We have measured the damage threshold of a series of different optical components at 1.06 μm, 3 ns. These optics were coated with anti-reflective, high reflectivity and polarized films. Damage thresholds for A.R. and H.R. were around 5 J/cm^2.

55260 **(CONF-810214—15-DRAFT) Antennas and waveguides for electron-cyclotron heating of plasmas.** England, A.C. (Oak Ridge National Lab., TN (USA)). 1981. Contract W-7405-ENG-26. 7p. NTIS, PC A02/MF A01. Order Number DE83017256.

From 4. topical conference on radio frequency plasma heating; Austin, TX, USA (9 Feb 1981).

It is clear that currently very simple as well as very advanced concepts are under investigation for antennas for ECH in various plasma devices. Future devices may be expected to incorporate very imaginative antennas. The present designs must be checked and their usefullness determined before these advanced concepts are employed.

55261 **(CONF-830389—1) Modeling and simulation of energy-removal system for superconducting magnets.** Bailey, J.M.; Googe, J.M.; Wood, R.J. (Tennessee Univ., Knoxville (USA); Oak Ridge National Lab., TN (USA)). 1983. Contract W-7405-ENG-26. 5p. NTIS, PC A02/MF A01. Order Number DE83017244.

From Southeastern symposium on system theory; Huntsville, AL, USA (28 Mar 1983).

Portions are illegible in microfiche products.

The Large Coil Test Facility at the Oak Ridge National Laboratory employs six D shaped superconducting coils. The coil current ranges from 10 to 20 kA. The protection scheme of these coils requires the coil current to be interrupted. This interruption will generate high-voltage transients in the coil. To prevent destruction of the coil isolation, these transients have to be reduced. Two types of suppressor networks, one a varistor and the other an R-C network, were reviewed. Then each suppressor circuit was simulated to determine the effectiveness of each suppressor. The modelling used the Super Sceptre computer program to simulate these transients.

55262 (CONF-830538—18) **US INTOR radiation-shield design.** Gohar, Y.; Abdou, M.A. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 12p. NTIS, PC A02/MF A01. Order Number DE83017912.

From 6. international conference on radiation shielding; Tokyo, Japan (16 May 1983).

Portions are illegible in microfiche products.

The US analysis for the INTOR radiation-shield design focused on three areas. First, a careful optimization process for the inboard shield composition and material arrangement within the allowable radial shield thickness was performed to minimize the radiation effects in the toroidal field (TF) coils. The TF coils are designed to last the lifetime of the reactor without change in performance. Second, the outboard bulk shield composition and material arrangement were optimized to achieve a dose equivalent outside the bulk shield of $\leq$ 2.5 mrem/h within one day after shutdown to permit personnel access to the reactor hall. Third, the penetration shields were designed to satisfy the same requirements as the outboard bulk shield.

55263 (CONF-830653—) **ECRH-transmission-system workshop.** (USDOE Office of Energy Research, Washington, DC. Office of Fusion Energy). Jul 1983. 324p. NTIS MF A01. Order Number DE83014930.

From ECRH transmission systems workshop; Germantown, MD, USA (16 Jun 1983).

Microfiche only, copy does not permit paper copy reproduction. Original copy available until stock is exhausted.

Abstracts and a listing of titles for each of the 18 papers are included. (MOW)

55264 (CONF-830653—, pp 1-6) **Beam waveguide launcher for electron cyclotron resonance plasma heating.** Vernon, R.J.; Audenaerde, K.R.; Beyer, J.B.; Hoppe, D.J.; Scharer, J.S. (Univ. of Wisconsin, Madison). Jul 1983. NTIS MF A01.

From ECRH transmission systems workshop; Germantown, MD, USA (16 Jun 1983).

A program is described to develop a system to convert the output of a gyrotron from a TE_{02} (or TE_{01}) circular waveguide mode to a free space gaussian TEM_{00} mode which can be directed by a system of mirrors to the plasma. The system will be developed for a frequency of 60 GHz but should be applicable to gyrotrons of frequencies slightly below to well above 60 GHz. Some new elements will be developed for the system and several presently available element designs will be incorporated. The overall program will also study some alternate or related microwave devices and transmission systems.

55265 (CONF-830653—, pp 7-11) **Summary of work by H.S. Yang and J.B. Beyer.** Audenaerde, K. (Univ. of Wisconsin, Madison). Jul 1983. NTIS MF A01.

From ECRH transmission systems workshop; Germantown, MD, USA (16 Jun 1983).

The present work concentrates on the step twist reflector used by Wengenroth to produce a pencil beam from a TE_{01} waveguide mode. Wengenroth's work was experimental and provided no theoretical analysis. We have analyzed the step twist reflector by extending the work of Hanfling et. al., and are able to predict the results of Wengenroth as well as to extend the design of this type of launcher to include TE/sub on/ excitation.

55266 (CONF-830653—, pp 12-29) **ECRH system at 28 GH/sub z/ on THOR tokamak.** Cirant, S. (CNR, Milano, Italy). Jul 1983. NTIS MF A01.

From ECRH transmission systems workshop; Germantown, MD, USA (16 Jun 1983).

55267 (CONF-830653—, pp 30-52) **Microwave transmission systems for the plasma separation process.** Christensen, T.E. (TRW, Redondo Beach, CA). Jul 1983. NTIS MF A01.

From ECRH transmission systems workshop; Germantown, MD, USA (16 Jun 1983).

The Plasma Separation Process now employs a 28 GHz cw gyrotron (VGA-8000) for electron cyclotron heating. Frequency increases to 56 GHz in FY 84 and $\sim$ 140 GHz in FY '87 are planned. The tripple miter bend waveguide system in use with the VGA-8000 will be upgraded to provide mode control. The mode output of the tube is being measured; cippled wall converters will transform the tube output (TE_{01}, TE_{02}, TE_{03}) to a single mode. Transmission will proceed through reduced diameter corrugated waveguide bends or bends will be eliminated by use of a horizontally mounted tube. Directional couplers will measure forward power in the dominant mode and multi-mode reflected power.

55268 (CONF-830653—, pp 53-72) **MFTF-B quasi-control ECRH transmission system/waveguide transmission system for TMX-U.** Porter, G. (Lawrence Livermore National Lab., CA). Jul 1983. NTIS MF A01.

From ECRH transmission systems workshop; Germantown, MD, USA (16 Jun 1983).

The MFTF-B ECRH transmission system is designed to transmit the rf produced by each gyrotron quasi-optically from a launch point inside of the vacuum vessel wall in a linearly polarized guassian beam mode to an open cavity enclosing the plasma. The open cavity allows the microwave beam to be reflected numerous times through the plasma before it is lost. This increases the heating efficiency at low densities and temperatures when absorption on a single pass is small and also at high (relativistic) temperatures. In addition, the cavities allow unobstructed passage of neutral beams and simplify compensation for resonant zone shifts caused by beta depression, doppler shifting and relativistic effects. The microwave beam feeding the cavity has a guassian amplitude profile and a nominal diameter of 50 cm.

55269 (CONF-830653—, pp 92-134) **EBT-S ECH transmission systems.** White, T. (Oak Ridge National Lab., TN). Jul 1983. NTIS MF A01.

From ECRH transmission systems workshop; Germantown, MD, USA (16 Jun 1983).

Over the past 18 months the EBT-S 28-GHz 200 kW cw mixed mode ECH system efficiency has increased from 70 to 80% by the substitution of 90° smooth radius W/G bends for the earlier miter bends, by eliminating several mode absorbers necessary for miter bend operation, and by optimizing the microwave coupling through the quasi-optical toroidal distribution manifold. Along with reduced system losses, these improvements have allowed the gyrotron sources to operate in a wider parameter range with high dc to rf conversion efficiency than previously attainable. Other components that have been developed besides radiused bends include T/sub i/O_2 mode absorbers, power splitters, bellows, and several types of high field mixed mode launchers. Details on these components will be presented as time allows.

55270 (CONF-830653—, pp 135-142) **National rf test facility.** Loring, M. (Oak Ridge National Lab., TN). Jul 1983. NTIS MF A01.

From ECRH transmission systems workshop; Germantown, MD, USA (16 Jun 1983).

Some possible specifications and uses of the test facility are outlined. (MOW)

55271 (CONF-830653—, pp 143-149) **ATF-1 program objectives.** England, A. (Oak Ridge National Lab., TN). Jul 1983. NTIS MF A01.

From ECRH transmission systems workshop; Germantown, MD, USA (16 Jun 1983).

Some parameters of the ATF facility are outlined. ECR heating requirements of ATF are listed. (MOW)

55272 (CONF-830653—, pp 150-173) **ETR transmission systems.** Metzler, D. Jul 1983. NTIS MF A01.

From ECRH transmission systems workshop; Germantown, MD, USA (16 Jun 1983).

The presentation concentrates on factors associated with transmission systems for reactors and/or reactor relevant devices. For present day mirrors and their upgrades where power levels are in the few hundred kW range, waveguide systems with mode control are preferred. Beyond the early 1990's time frame are the ETR DEMO and reactor devices. These require injected power levels of about 75 MW. If only power oscillators are available at that time,

then a MARS like transmission system may be appropriate or possibly a guided wave waveguide.

55273 (CONF-830653—, pp 174-190) **Design of the 60 GH/sub z/ system.** Moeller, C. (GA Technologies, San Diego, CA). Jul 1983. NTIS MF A01.

From ECRH transmission systems workshop; Germantown, MD, USA (16 Jun 1983).

55274 (CONF-830653—, pp 191-203) **CW waterload, etc.** Jory, H. (Varian, Palo Alto, CA). Jul 1983. NTIS MF A01.

From ECRH transmission systems workshop; Germantown, MD, USA (16 Jun 1983).

55275 (CONF-830653—, pp 204-219) **ECRH transmission systems for PDX, PLT, TFTR and upgrades.** Doane, J.L. (Princeton Plasma Physics Lab., NJ). Jul 1983. NTIS MF A01.

From ECRH transmission systems workshop; Germantown, MD, USA (16 Jun 1983).

55276 (CONF-830653—, pp 220-259) **Transmission lines and launching systems for ECRH on the garching stellarators W VIIa and W VII-AS.** Thumm, M. (Univ. of Stuttgart, Germany); Janzen, G.; Mueller, G.; Schueller, P.G.; Wilhelm, R.; Erckmann, V. Jul 1983. NTIS MF A01.

From ECRH transmission systems workshop; Germantown, MD, USA (16 Jun 1983).

The transmission lines and launching systems for non ohmic plasma production and heating by ECR-waves at 28 GHz (200 kW, 40 ms) and 70 GHz (200 kW, 100 ms) in the Garching Wendelstein Stellarator W VIIa and at 70 GHz (800 kW, cw) in the future Advanced Stellarator W VII-AS are described. The ECRH systems meet the requirements for neutral gas breakdown (R-wave), heating of a cold plasma (X-mode) and heating of a warm plasma (0-mode) in a combined way. Periodically modulated wall mode converters (sinusoidal m=0 radius modulation, a_0=31.75 mm at 28 GHz, a_0=13.9 mm at 70 GHz) convert the circular electric TE/sub on/ gyrotron output mode mixture (mainly TE_{02} mode) into a pure TE_{01} wave which is used for the long distance transmission in smooth overmoded waveguides (I.D. = 63.5 mm). At the converter inputs the phases between the TE/sub on/ modes are matched by phase shifters. The measured conversion efficiency for characteristic mode mixtures ($TE_{02}/TE_{01}/TE_{03}$) at 28 GHz is about 98 %. For the geometrical and electrical matching of different waveguide diameters waveguide tapers with approximate Tschebycheff mode-conversion responses are used.

55277 (CONF-830653—, pp 260-279) **ECRH transmission system.** Levine, J. (NRL, Washington, DC). Jul 1983. NTIS MF A01.

From ECRH transmission systems workshop; Germantown, MD, USA (16 Jun 1983).

55278 (CONF-830653—, pp 280-298) **ECRH transmission system.** Tancredi, J. Jul 1983. NTIS MF A01.

From ECRH transmission systems workshop; Germantown, MD, USA (16 Jun 1983).

Hughes, Electron Dynamics Division is developing gyrotrons for ECRH requirements. In the development program, techniques have been evolved for transmission system components. These techniques include over-moded waveguide tapers, high average power windows, and rf water loads for testing.

55279 (CONF-830653—, pp 299-311) **ECRH transmission system.** Temkin, R. (Massachusetts Inst. of Tech., Cambridge). Jul 1983. NTIS MF A01.

From ECRH transmission systems workshop; Germantown, MD, USA (16 Jun 1983).

The M.I.T. gyrotron group operates a 140 GHz, short pulse (1μs) gyrotron with output power, at present, of up to 175 kW. Output radiation has been obtained in several modes, including TE_{03} at 140 GHz, TE_{23} at 137 GHz, TE_{42} at 128 GHz and TE_{82} at 145 GHz. Studies have been carried out of the mode purity, both in frequency and in space, of gyrotron output radiation. These studies investigate parasitic mode excitation and mode conversion of gyrotron output power. Far field patterns of gyrotron radiation have been investigated to determine mode symmetry and purity. These results are useful in estimating the efficiency of various transmission systems. Finally, a new approach to quasi-optical transmission lines and mode converters, using axisymmetric optics, is suggested.

55280 (CONF-830653—, pp 312-313) **TARA considerations.** Mauel, M.E. (Massachusetts Inst. of Tech., Cambridge). Jul 1983. NTIS MF A01.

From ECRH transmission systems workshop; Germantown, MD, USA (16 Jun 1983).

55281 (CONF-830795—3) **Self-pumping impurity by in-situ metal deposition.** Brooks, J.N.; Mattas, R.F. (Argonne National Lab., IL (USA)). Jul 1983. Contract W-31-109-ENG-38. 24p. NTIS, PC A02/MF A01. Order Number DE83017937.

From Symposium on energy removal and particle control and toroidal fusion devices; Princeton, NJ, USA (26 Jul 1983).

A system for in-situ removal of helium trapping in freshly deposited metal surface layers of a limiter or divertor has been studied. The system would trap helium on a limiter front surface, or a divertor plate, at low plasma edge temperatures, or in a limiter slot region, at high edge temperatures. Fresh material, introduced to the plasma and/or scrape-off zone, would be added at a rate of about five times the alpha production rate. The material would be reprocessed periodically, e.g. once a year. Possible materials are nickel, vanadium, niobium, and tantalum. Advantages of a self-pumping system are the absence of vacuum ducts and pumps, and the minimization of tritium processing and inventory.

55282 (CONF-830841—13) **Spallation and 14-MeV neutron irradiation of stabilized NbTi superconductors.** Hahn, P.; Brown, B.S.; Weber, H.W.; Guinan, M.W. (Argonne National Lab., IL (USA); Lawrence Livermore National Lab., CA (USA)). Aug 1983. Contract W-31-109-ENG-38. 9p. NTIS, PC A02/MF A01. Order Number DE83017973.

From Cryogenic engineering conference and international cryogenic materials conference; Colorado Springs, CO, USA (15 Aug 1983).

The results on 5 K irradiation available so far may be summarized as follows. (1) Increases of j/sub c/ following neutron irradiation occur only in conductors which are far from the optimal metallurgical treatments. (2) The changes of j/sub c/ following neutron irradiation and a thermal cycle to room temperature are small and in most cases comparable to the results obtained after 77 K irradiation. (3) The data available so far indicate that the degradation of j/sub c/ at 8 T is larger by about 5 to 10% than the corresponding changes at 5 T at a neutron fluence of 1.3 x 10^{22} m^{-2} (E > 0.1 MeV). (4) The increase of Cu-resistivity is significant even after a thermal cycle to room temperature and requires design changes for a stable magnet operation.

55283 (CONF-830942—5) **Neutron irradiation and compatibility testing of Li_2O.** Porter, D.L.; Krsul, J.R.; Laug, M.T.; Walters, L.C.; Tetenbaum, M. (Argonne National Lab., Idaho Falls, ID (USA); Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 9p. NTIS, PC A02/MF A01. Order Number DE83017278.

From 3. topical meeting on fusion reactor materials; Albuquerque, NM, USA (19 Sep 1983).

A study was made of the neutron-irradiation behavior of ^{6}Li-enriched Li_2O material in EBR-II. In addition, a stress-corrosion study was performed ex-reactor to test compatibility of Li_2O materials with a variety of stainless steels. Results of the irradiation testing showed that tritium and helium retention in the Li_2O (~ 89% dense) lessened with neutron exposure. Helium and tritium retention appear to approach steady-state after ~ 1% ^{6}Li burnup. The stress-corrosion studies, using 316 stainless steel (Ti-modified) and a 35% Ni alloy, showed that stress does not enhance the corrosion, and that dry Li_2O is not significantly corrosive, the LiOH content producing the corrosive effects. Corrosion, in general, was not severe as a passivation in sealed capsules seemed to occur after a time, greatly reducing corrosion rates.

55284 **(CONF-8106311—2-Draft) PAFMOV: a PAFEC to MOVIE.BYU conversion.** Baudry, T.V.; Gray, W.H. (Oak Ridge National Lab., TN (USA)). 1981. Contract W-7405-ENG-26. 23p. NTIS, PC A02/MF A01. Order Number DE83017250.

From PAFEC user's conference; Knoxville, TN, USA (9 Jun 1981).

Portions are illegible in microfiche products.

Described is a program, PAFMOV, that formats data from a PAFEC level 3.3 backing storage file (BSF) into a form suitable for MOVIE.BYU version 3.3. With the addition of a new control module, PAFMOV has been fully integrated into the PAFEC system at Oak Ridge National Laboratory (ORNL). A discussion of the FORTRAN program is presented as well as a sample problem.

55285 **(CONF-8204141—1) Neutral beam data systems at ORNL.** Stewart, C.R. (Oak Ridge National Lab., TN (USA)). 1982. Contract W-7405-ENG-26. 18p. NTIS, PC A02/MF A01. Order Number DE83017225.

From Data acquisition for fusion devices workshop (FEDC); Oak Ridge, TN, USA (14 Apr 1982).

Portions are illegible in microfiche products.

A control system for neutral injection beam lines has been designed, implemented, and used with much success. Despite the problems with very high power levels this system is very successful in relieving the operators burdens of slow conditioning, data recording, and mode switching. The use of computer control with multiple beam lines now appears very promising.

55286 **(CONF-8305128—1) Using PAFEC as a preprocessor for COSMIC/NASTRAN.** Gray, W.H.; Baudry, T.V. (Oak Ridge National Lab., TN (USA); PAFEC Engineering Consultants, Knoxville, TN (USA)). 1983. Contract W-7405-ENG-26. 12p. NTIS, PC A02/MF A01. Order Number DE83017179.

From 11. NASTRAN user's colloquium; San Francisco, CA, USA (2 May 1983).

Programs for Automatic Finite Element Calculations (PAFEC) is a general-purpose, three-dimensional linear and nonlinear finite element program. PAFEC's features include free-format input utilizing engineering keywords, powerful mesh generating facilities, sophisticated database management procedures, and extensive data-validation checks. Presented here is a description of a software interface that permits PAFEC to be used as a preprocessor for COSMIC/NASTRAN. This user-friendly software, called PAFCOS, frees the stress analyst from the laborious and error prone procedure of creating and debugging a finite-element model with PAFEC, thus taking full advantage of the free-format engineering-keyword-oriented data structure of PAFEC, the amount of time spent during model generation can be drastically reduced. The PAFCOS software will automatically convert a PAFEC data structure into a COSMIC/NASTRAN bulk data deck. The capabilities and limitations of the PAFCOS software are fully discussed in the following report.

55287 **(DOE/ER/03077—179) Fast reconnection of magnetic fields in a plasma.** Hu, P.N. (New York Univ., NY (USA). Magneto-Fluid Dynamics Div.). Jan 1983. Contract AC02-76ER03077. 27p. NTIS, PC A03/MF A01. Order Number DE83017123.

Reconnection process of magnetic fields in a plasma is analytically studied by perturbing the boundary conditions on a slab of incompressible plasma with a resonant surface inside. It is found, for small resistivity, that the reconnection takes place on Alfven time scale and continues into a slow time scale t_i = eta/sup 1/3/t. Both time scales are faster than the usual tearing time scale. Furthermore, the plasma evolves globally from its initial equilibrium on the slow time scale and settles down to a different final equilibrium.

55288 **(DOE/RA/50146—T1) Summary report: laser candidates for inertial fusion.** (Northern Indiana Public Service Co., Hammond (USA)). 1980. Contract FG01-80RA50146. 7p. NTIS, PC A02/MF A01. Order Number DE83017452.

During the period of mid-FY78 through early FY80, the DOE Office of Inertial Fusion (OIF) Advanced Laser Program transitioned from investigation at the small scale laboratory experiment level of several device candidates to a focus on scaling of related short wavelength systems, notably KrF. During this transition, WJSA performance under the above tasks provided responsive technical inputs to: (1) assist OIF in its comparative assessment of the initial candidates and selection of programs for further effort, (2) provide criteria for laser performance requirements necessary for reactor driver commercial feasibility, (3) project technology levels achievable as a function of time and resource investment, and (4) identify critical technical issues requiring resolution.

55289 **(GA-A—17012) Nuclear design of a very-low-activation fusion reactor.** Cheng, E.T.; Hopkins, G.R. (GA Technologies, Inc., San Diego, CA (USA)). Jun 1983. Contract AT03-76ET51011. 7p. (CONF-830406—109). NTIS, PC A02/MF A01. Order Number DE83017470.

From 5. topical meeting on technology of fusion energy; Knoxville, TN, USA (26 Apr 1983).

An investigation was conducted to study the nuclear design aspects of using very-low-activation materials, such as SiC, MgO, and aluminum for fusion-reactor first wall, blanket, and shield applications. In addition to the advantage of very-low radioactive inventory, it was found that the very-low-activation fusion reactor can also offer an adequate tritium-breeding ratio and substantial amount of blanket nuclear heating as a conventional-material-structured reactor does. The most-stringent design constraint found in a very-low-activation fusion reactor is the limited space available in the inboard region of a tokamak concept for shielding to protect the superconducting toroidal field coil. A reference design was developed which mitigates the constraint by adopting a removable tungsten shield design that retains the inboard dimensions and gives the same shield performance as the reference STARFIRE tokamak reactor design.

55290 **(GA-A—17016) Minimum-thickness low-activation toroidal field coil concept for tokamak reactors.** Chen, W.; Cheng, E.T. (GA Technologies, Inc., San Diego, CA (USA)). Jun 1983. Contract AT03-76ET51011. 7p. (CONF-830406—107). NTIS, PC A02/MF A01. Order Number DE83017689.

From 5. topical meeting on technology of fusion energy; Knoxville, TN, USA (26 Apr 1983).

Portions are illegible in microfiche products.

A minimum-thickness, low-activation toroidal-field-coil design concept is presented. The concept is consistent with the low-activation fusion-reactor design requirements suitable for STARFIRE-type devices. The design approach consists mainly of replacing the high-activation components such as stainless steel structure and copper stabilizer in the high-flux region of the TF coils by low-activation components such as aluminum alloy structure and aluminum stabilizer, while leaving the core of the coils unchanged from earlier designs. The resulting low-activation front regions will reduce the dose level due to its lower residual activity and the fact that it is acting as a shield between the high-activity core and the personnel-access area. The cross-sectional areas required for various low-activation TF coil options were compared in order to develop a design that fits within the very constrained space suitable in the inboard region of a tokamak reactor.

55291 **(GA-A—17018) Low-activation fusion-reactor design studies.** Hopkins, G.R.; Cheng, E.T.; Creedon, R.L.; Maya, I.; Schultz, K.R.; Trester, P.; Wong, C.P.C. (GA Technologies, Inc., San Diego, CA (USA)). Jun 1983. Contract AT03-76ET51011. 7p. (CONF-830406—108). NTIS, PC A02/MF A01. Order Number DE83017688.

From 5. topical meeting on technology of fusion energy; Knoxville, TN, USA (26 Apr 1983).

Portions are illegible in microfiche products.

A design study for a low-activation tokamak fusion reactor based on the STARFIRE baseline design has been done. The major components of limiter, first wall, blanket, shield and toroidal field coils have all been designed with very-low-activation materials and designs appear technically achievable. The result provides a fusion power reactor with a high degree of direct personnel access for maintenance and repair, with a large reduction in safety and environmental impact, and with much reduced waste-disposal problems.

This low-activation design also appears economically attractive and is expected to have a high degree of public acceptance.

55292 **(GA-A—17157) Applying process-control techniques to a research environment: on-line controls & instrumentation for Doublet III fusion project.** Drobnis, D.D. (GA Technologies, Inc., San Diego, CA (USA)). Sep 1983. Contract AT03-76ET51011. 22p. (CONF-8309140—1). NTIS, PC A02/MF A01. Order Number DE83016968.

From 11. conference on process automation and instrumentation; Harmerville, PA, USA (13 Sep 1983).

Portions are illegible in microfiche products.

The system design is given in terms of the following: (1) conventional aspects, (2) architecture, (3) electronic interfaces, (4) operator interfaces, (5) unconventional aspects, (6) electrical energy, (7) electrical noise, (8) operating flexibility, and (9) command procedure development. (MOW)

55293 **(NP—3900904) Acceleration experiments at low power density.** Belli, P.; Bruno, I.; Caruso, A.; Cerioni, I.; Di Paolo, A.; Galanti, M.; Gatti, G.; Gazzi, G.; Gratton, R.; Giupponi, P. (Comitato Nazionale per l'Energia Nucleare, Frascati (Italy)). Feb 1982. 22p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83900904.

Portions are illegible in microfiche products.

Plane thin (2 to 3 μm) disks have been irradiated at a power density $\simeq 10^{12}$ W/cm^2. Two-dimensional time-resolved optical diagnostic and one-dimensional streak-resolved shadows have been used to study the dense phase and corona behavior; x-ray imaging has been used for temperature measurements and for focal spot definition.

55294 **(NRL-MR—5184) Decoupling ion efficiency from impedance in pulsed-power diodes.** Barker, R.J.; Goldstein, S.A. (Naval Research Lab., Washington, DC (USA)). 14 Sep 1983. Contract AI08-79DP40092. 59p. NTIS, PC A04/MF A01. Order Number DE83018114.

Portions are illegible in microfiche products.

Classical axis diode theory links the impedance of a diode to its ion production efficiency (i.e., the fraction of diode power carried by ions). This linkage stems from the dependence of both impedance and efficiency on the aspect ratio of the given device. This ratio is defined as the cathode outer radius, R, divided by the axial anode-cathode (A-K) gap, D. Numerical simulations and experiments have been completed which demonstrate that the ion efficiency, eta/sub i/, is strictly proportional only to the typical path-length, L, of electrons in the A-K gap and that this length need not be related to R. Specifically, a radial pinch-reflex diode geometry is examined in which the anode is a cylindral shell of radius, R + D and of length 2L. For this device, eta/sub i/ is found to vary as L/D while the impedance, Z/sub d/, varies as R/D. This decoupling of eta/sub i/ from Z/sub diode/ offers significant new possibilities for high power/high voltage intense ion beam sources as well as for high power/low voltage intense electron beam sources. A series of numerical simulations using the PREMAS diode-modeling code have been completed for diode geometries which demonstrate both of these applications. Preliminary experimental results confirm the theory as well as the numerical predictions.

55295 **(PB—83-210872) Large aperture calorimeter for fusion laser measurements.** Edwards, J.G.; Smith, P.A. (National Physical Lab., Teddington (UK). Div. of Electrical Science). [nd]. 16p. NTIS, PC E03/MF E03.

The authors designed and constructed a large aperture calorimeter intended for laser fusion measurements on beams up to 20 cm diameter. The laser beam is absorbed in a glass disc backed by a disc carry a resistance wire. Although it performs essentially as expected with a noise equivalent energy of 20 mJ and a maximum energy of about 100 J, difficulties in construction give a 17% variation of sensitivity across the aperture. To overcome this problem it would probably be necessary to adopt an integral construction with the resistance bridge formed from an etched film on the back of the absorbing glass.

55296 **(SAND—83-0564C) Analysis of mechanisms for anode plasma formation in ion diodes.** Sweeney, M.A.; Brandenburg, J.E.; Gerber, R.A.; Johnson, D.J.; Hoffman, J.M.; Miller, P.A.; Quintenz, J.P.; Slutz, S.A.; Bieg, K.W. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 6p. (CONF-830911—6). NTIS, PC A02/MF A01. Order Number DE83017793.

From 5. international conference on high power particle beams; San Francisco, CA, USA (12 Sep 1983).

Portions are illegible in microfiche products.

Understanding how anode plasma is formed in intense pulsed-power ion diodes by insulator breakdown is important in assessing the effect on ion beam quality. Formation of a passive flashover anode plasma source may involve one or more of the following: polarization of the anode dielectric, direct leakage electron bombardment, UV-stimulated desorption of excited gas in the gap or on the anode surface, ionization of desorbed neutrals in a surface plasma by electron return currents associated with ion extraction, or bombardment by low energy electrons or negative ions. At Sandia National Laboratories experiments have been done on Nereus, PI 110A, Proto I, Proto II, HydraMITE, and PBFA I using anodes with dielectric-filled surfaces. The experiments represent a variety of anode turn-on delays (2 to 15 ns), magnetic field strengths (7 to 30 kG), voltages (300 keV to 2 MeV), and anode configurations. Data include ion beam current from Faraday cups, holographic observation of plasma motion, the spatial and temporal character of visible light emitted from the plasma, and optical metallographic examination of the dielectric.

55297 **(SAND—83-0575C) Ampfion hybrid diodes on Hydramite and PBFA-I.** Mendel, C.W. Jr.; Quintenz, J.P.; Miller, P.A.; Anderson, R.J.; Crow, J.T.; Rosenthal, S.E.; Widner, M.M.; VanDevender, J.P. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 6p. (CONF-830911—9). NTIS MF A01. Order Number DE83017824.

From 5. international conference on high power particle beams; San Francisco, CA, USA (12 Sep 1983).

Microfiche only, copy does not permit paper copy reproduction.

Three diodes are discussed; a 20 cm focal length equatorial-feed or extraction diode for the 0.8 TW Hydramite pulser and 25 and 15 cm focal length polar-feed diodes for the PBFA-I pulser (~ 10 TW at the diode terminals). The presentation will show progress toward the ultimate goals of high efficiency and small focus. More importantly, data will be presented which leads us to conclude that the diode is reasonably well understood. This includes data on the uniformity of the diode output, data showing the interaction of the relativistic electron cloud with the field coil, data showing the accuracy of focusing predictions, and other comparisons between data and theoretical modeling. One critical and poorly understood part of the diode is the anode. Anode turn-on delay will be discussed, along with the limitations it implies for our present technology.

55298 **(SAND—83-0609C) Overview of ion-diode research.** Miller, P.A. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 7p. (CONF-830911—4). NTIS, PC A02/MF A01. Order Number DE83017791.

From 5. international conference on high power particle beams; San Francisco, CA, USA (12 Sep 1983).

Portions are illegible in microfiche products.

Research into generation of intense proton beams has been conducted using Applied-B, Hybrid, and Pinch Reflex ion diodes. This work has been carried out in close collaboration with Cornell University and the Naval Research Laboratory. The goal of this work is to determine the ion diode configuration which maximizes the probability of achieving target ignition on PBFA II, which is to be operational at Sandia in 1986. Diodes of all three types have been tested and compared on PBFA I and elsewhere, and scaling calculations have been carried out. Data have been obtained about diode efficiency, impedance behavior, microscopic and global divergence, ion transport and neutralization, and MITL-diode coupling, and novel diagnostic techniques have been developed. Results of diode comparisons and an overview of the diode research

are presented, with detailed treatments being presented in accompanying papers.

55299 **(SAND—83-0611C) Applied-B ion diode experiments on PBFA I.** Dreike, P.L.; Burns, E.J.T.; Johnson, D.J.; Slutz, S.A.; Crow, J.T.; Leeper, R.J.; Mix, L.P.; Perry, F.C.; Seidel, D.B. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 5p. (CONF-830911—7). NTIS, PC A02/MF A01. Order Number DE83017792.

From 5. international conference on high power particle beams; San Francisco, CA, USA (12 Sep 1983).

Portions are illegible in microfiche products.

The Applied-B diode has produced the highest brightness proton beam of any diode at the 1 TW and 3 TW power levels on the Proto-I and Proto-II accelerators. An experiment has begun on PBFA I to study the diode's electrical coupling to the accelerator, ion conversion efficiency, and focusability of the proton component of the beam. The particular diode is a slightly larger version of a diode used successfully on Proto II. The diode radius has been increased from 14 cm to 15 cm, and the height from 5 cm to 6 cm, increasing the diode area from 440 cm^2 to 560 cm^2 to accomodate PBFA-I's lower output impedance. Current neutralized beam propagation is provided by injecting the beam into a gas cell with a 2 m mylar window a few mm from the AK gap, typically filled with 5 Torr argon. We will discuss the status of these experiments.

55300 **(SAND—83-0612C) Diagnosing the ion beam on the Applied-B diode.** Burns, E.J.T.; Crow, J.T.; Dreike, P.L.; Johnson, D.J.; Leeper, R.J.; Mix, L.P.; Perry, F.C.; Slutz, S.A.; Stygar, W.A.; Chang, J. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 5p. (CONF-830911—5). NTIS, PC A02/MF A01. Order Number DE83017822.

From 5. international conference on high power particle beams; San Francisco, CA, USA (12 Sep 1983).

Portions are illegible in microfiche products.

A variety of diagnostics measure the ion beam parameters from the Applied-B diode on the PBFA-I accelerator. New hanger dB/dt monitors measure the voltage in the diode feeds. The total proton charge is measured by Li/Cu activation. A Rutherford-scatterer, Thomson parabola particle analyzer measures approximately 50% of the ion current as carbon and oxygen ions from the epoxy-filled grooved anodes. The microscopic divergence of the proton beam is 15 and 25 milliradians HWHM in the horizontal and vertical directions, respectively, as measured by a Rutherford-scattering camera.

55301 **(SAND—83-0617C) Using inner-shell x-rays as an ion-beam diagnostic.** Montry, G.R.; McGuire, E.J.; Burns, E.J.T. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 4p. (CONF-830911—12). NTIS, PC A02/MF A01. Order Number DE83017784.

From 5. international conference on high power particle beams; San Francisco, CA, USA (12 Sep 1983).

Portions are illegible in microfiche products.

A beam of protons impinging on a metal foil will ionize inner shell electrons, leaving an atom in an excited state. The atom will then decay via a cascade of Auger or radiative transitions. An analysis has been done of the various radiative transitions resulting from the ionization of M-shell electrons in gold foils. The results of the analysis have been combined with a 1-D hydrodynamic code in order to predict the time dependent x-ray signals emitted from a target irradiated by proton beams. A comparison of the theoretical and measured signals shows that inner shell x-rays can be used as a viable ion beam diagnostic. In particular, gold M-shell radiation has been used to infer the proton current as a function of time with the applied-B ion diode on the PROTO I accelerator.

55302 **(SAND—83-0620C) Ion stopping in heated targets.** Olsen, J.N.; Mehlhorn, T.A.; Johnson, D.J.; Dreike, P.L. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 5p. (CONF-830911—10). NTIS, PC A02/MF A01. Order Number DE83017800.

From 5. international conference on high power particle beams; San Francisco, CA, USA (12 Sep 1983).

Portions are illegible in microfiche products.

Ion stopping departs from classical, cold material values as the target material heats to appreciable ionization levels. We are investigating this phenomenon experimentally on the Proto I accelerator with a radial, Applied-B field ion diode. When the beam is focused to 0.5 TW/cm^2 on thin aluminium foil targets the time-resolved departure from cold stopping is clear. Our observations and early interpretations will be presented.

55303 **(SAND—83-0950C) Retention and thermal release of deuterium implanted in beryllium.** Wampler, W.R. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 6p. (CONF-830942—4). NTIS, PC A02/MF A01. Order Number DE83017790.

From 3. topical meeting on fusion reactor materials; Albuquerque, NM, USA (19 Sep 1983).

Beryllium was implanted at room temperature with deuterium at 500 and 1500 eV while the amount of D retained was measured as a function of incident fluence using nuclear-reaction analysis. At low fluences almost all of the incident D is retained but at high fluences the retention saturates. The retention is well described by a saturation model using a saturation concentration of 0.31 +- .05 D/Be and D depth profiles calculated by the TRIM code. Isochronal annealing of implanted samples shows that the D is thermally released in two states, a broad stage at 400 +- 100°C and a stage at 125°C. For samples implanted to saturation, most of the D is released in the 125°C stage but no release occurs at this temperature for low-dose implants.

55304 **(SAND—83-1316C) Beam-target interaction of intense ion beams: theory and experiment.** Mehlhorn, T.A.; Peek, J.M.; Olsen, J.N.; McGuire, E.J.; Farnsworth, A.V. Jr.; Young, F.C. (Sandia National Labs., Albuquerque, NM (USA); Naval Research Lab., Washington, DC (USA)). 1983. Contract AC04-76DP00789. 7p. (CONF-830911—11). NTIS, PC A02/MF A01. Order Number DE83018264.

From 5. international conference on high power particle beams; San Francisco, CA, USA (12 Sep 1983).

Portions are illegible in microfiche products.

Work has continued toward the goal of developing and experimentally verifying a numerical model that can accurately predict the stopping power of any ion in any target material at any density, temperature, and degree of ionization. We will review our most recent theoretical work to compute the stopping power of low-Z ions in partially ionized material. We are presently attempting to develop an accurate description of the atomic-electron contribution to the stopping power, especially around the maximum of the curve. Our atomic-electron stopping-power models (e.g., the Local Oscillator Model, the Generalized Oscillator Strength Model, etc.) use realistic descriptions of atomic and solid-state charge densities and energy levels.

55305 **(SAND—83-1992C) Light-ion-beam fusion.** VanDevender, J.P. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 7p. (CONF-830911—8). NTIS, PC A02/MF A01. Order Numbe- DE83018263.

From 5. international conference on high power particle beams; San Francisco, CA, USA (12 Sep 1983).

Portions are illegible in microfiche products.

The Inertial Confinement Fusion Program with Light Ion Drivers is developing high-intensity ion-beam-driver technology on PBFA I and will apply that technology to study implosion hydrodynamics of small fuel masses on PBFA II. Power concentration is the key issue. The research on beam production and focusing is interpreted to given guidelines for future research in the ICF Program. Recent progress is reviewed briefly and the impact of recently discovered problems of ion impurities and beam energy spread are discussed. The lithium-ion option or PBFA II has been chosen, and the rationale for that decision is summarized.

55306 **(SLAC-PUB—3113) New heavy-ion-fusion accelerator research program.** Herrmannsfeldt, W.B. (Stanford Linear Accelerator Center, CA (USA)). May 1983. Contract AC03-76SF00515. 12p. (CONF-830920—8). NTIS, PC A02/MF A01. Order Number DE83014898.

From 7. symposium on sources and ion assisted technology and 4. international conference on ion and plasma assisted techniques; Kyoto, Japan (12 Sep 1983).

This paper will briefly summarize the concepts of Heavy Ion Fusion (HIF), especially those aspects that are important to its potential for generating electrical power. It will also note highlights of the various HIF programs throughout the world. Especially significant is that the US Department of Energy (DOE) plans a program, beginning in 1984, aimed at determining the feasibility of using heavy ion accelerators as drivers for Inertial Confinement Fusion (ICF). The new program concentrates on the aspects of accelerator design that are important to ICF, and for this reason is called HIF Accelerator Research.

55307 **(UCID—19837) Irradiations at the Rotating Target Neutron Source-II. 1982 annual report: Joint US-Japan Sponsorship.** (Lawrence Livermore National Lab., CA (USA)). 1982. Contract W-7405-ENG-48. 71p. NTIS, PC A04/MF A01. Order Number DE83017706.

This report gives an overview of the facility along with brief descriptions of experiments by Japanese and US scientists. (MOW)

55308 **(UCRL—88209) Secret high-temperature reactor concept for inertial fusion.** Monsler, M.J.; Meier, W.R. (Lawrence Livermore National Lab., CA (USA)). 1983. Contract W-7405-ENG-48. 19p. (CONF-830406—110). NTIS, PC A02/MF A01. Order Number DE83017835.

From 5. topical meeting on technology of fusion energy; Knoxville, TN, USA (26 Apr 1983).

The goal of our SCEPTRE project was to create an advanced second-generation inertial fusion reactor that offers the potential for either of the following: (1) generating electricity at 50% efficiency, (2) providing high temperature heat (850°C) for hydrogen production, or (3) producing fissile fuel for light-water reactors. We have found that these applications are conceptually feasible with a reactor that is intrinsically free of the hazards of catastrophic fire or tritium release.

55309 **(UCRL—88667) Low-jitter, hydrogen thyratron Pockels cell driver.** Oicles, J.A.; Kitchin, H.D. (Lawrence Livermore National Lab., CA (USA); Cardon Instrument Co., Colchester, Essex (UK)). Jun 1983. Contract W-7405-ENG-48. 14p. (CONF-830621—41). NTIS, PC A02/MF A01. Order Number DE83017370.

From IEEE power electronics specialists conference; Albuquerque, NM, USA (6 Jun 1983).

The requirements to be met by Pockels cell drivers for incorporation into the Novette and Nova Laser systems are presented, and critical aspects of the specification examined. A high-performance pulse generator has been developed to meet these requirements using new thyratron technology from the English Electric Valve Co. Ltd. Two closely related versions have been built; a 10KV output unit with 9 nsec risetime into five parallel 50-ohm loads and a faster 5KV output driver with 3.5 nsec risetime into a single 50-ohm load. The design approach for optimizing performance, using the new tubes in relation to the LLNL specification is described, including the techniques used for control of electromagnetic interference.

55310 **(UCRL—88811) Advanced high-field coil designs: 20 TESLA.** Hoard, R.W.; Cornish, D.N.; Scanlan, R.M.; Zbasnik, J.P.; Leber, R.L.; Hickman, R.B.; Lee, J.D. (Lawrence Livermore National Lab., CA (USA)). 8 Aug 1983. Contract W-7405-ENG-48. 11p. (CONF-830841—11). NTIS, PC A02/MF A01. Order Number DE83017368.

From Cryogenic engineering conference and international cryogenic materials conference; Colorado Springs, CO, USA (15 Aug 1983).

Portions are illegible in microfiche products.

This study of the technology required for producing large high-field coils has shown that, with some extensions to our present technological base, feasible designs are achievable. The resulting magnets could well make a paramount contribution to the national mirror-fusion endeavor.

55311 **(UCRL—88916) Vacuum measurements on the Tandem Mirror Experiment Upgrade (TMX-U) fusion experiment.** Calderon, M.O.; Hunt, A.L.; Lang, D.D.; Nexsen, W.E.; Pickles, W.L.; Turner, W.C. (Lawrence Livermore National Lab., CA (USA)). 12 Aug 1983. Contract W-7405-ENG-48. 29p. (CONF-8309103—7). NTIS, PC A03/MF A01. Order Number DE83017836.

From 9. international vacuum congress and 5. international conference on solid surfaces; Madrid, Spain (26 Sep 1983).

The gas inventory of the Tandem Mirror Experiment Upgrade (TMX-U) must be carefully controlled, if it is to successfully create various plasma configurations for thermal-barrier experiments designed to provide an improved performance for tandem-mirror experiments. This paper is a progress report on the calibration methods and pressure measurements of machine conditions deriving from recently improved neutral-beam gas control, and changes to the internal baffling geometry and the gettering system.

55312 **(UCRL—88964) Design and construction of the vacuum vessel for the tandem Mirror Fusion Test Facility.** Gerich, J.W. (Lawrence Livermore National Lab., CA (USA)). 12 Aug 1983. Contract W-7405-ENG-48. 21p. (CONF-8309103—6). NTIS, PC A02/MF A01. Order Number DE83017367.

From 9. international vacuum congress and 5. international conference on solid surfaces; Madrid, Spain (26 Sep 1983).

We have designed the MFTF-B vacuum vessel both to maintain the required vacuum environment and to structurally support the 42 superconducting magnets plus auxiliary internal and external equipment. The design calculations were greatly aided by computer models, which also speeded our redesign effort when the machine configuration was changed to the Axicelll MFTF-B this past year. Our field construction and erection effort should meet the July 1984 completion date for the vacuum vessel.

55313 **(UCRL—89296) Summary of the MARS tandem-mirror reactor design.** Logan, B.G. (Lawrence Livermore National Lab., CA (USA)). 1 Sep 1983. Contract W-7405-ENG-48. 27p. (CONF-830909—8). NTIS, PC A03/MF A01. Order Number DE83017293.

From Course and workshop on mirror-based and field-reversed approaches to magnetic fusion; Varenna, Italy (7 Sep 1983).

A recently completed two-year study of a commercial tandem-mirror reactor design [Mirror Advanced Reactor Study (MARS)] is briefly reviewed. The end plugs are designed for trapped-particle stability, MHD ballooning, balanced geodesic curvature, and small radial electric fields in the central cell. New technologies such as lithium-lead blankets, 24 T hybrid coils, gridless direct converters and plasma halo vacuum pumps are highlighted. General characteristics of the MARS tandem mirror and STARFIRE tokamak reactor design are compared. A design of an upgrade of MFTF-B incorporating many of the MARS features is discussed.

55314 **(UCRL—89745) Physics considerations for tandem-mirror magnet design.** Baldwin, D.E. (Lawrence Livermore National Lab., CA (USA)). 22 Aug 1983. Contract W-7405-ENG-48. 33p. (CONF-830909—3). NTIS, PC A03/MF A01. Order Number DE83017374.

From Course and workshop on mirror-based and field-reversed approaches to magnetic fusion; Varenna, Italy (7 Sep 1983).

Portions are illegible in microfiche products.

This lecture describes the physics considerations entering the magnet design of a quadrupole-stabilized, tandem-mirror system.

55315 **(UCRL—89750) Creation of ultra-high-pressure shocks by the collision of laser-accelerated disks: experiment and theory.** Rosen, M.D.; Phillion, D.W.; Price, R.H.; Campbell, E.M.; Obenschain, S.P.; Whitlock, R.R.; McLean, E.A.; Ripin, B.H. (Lawrence Livermore National Lab., CA (USA); Naval Research Lab., Washington, DC (USA)). 24 Aug 1983. Contract W-7405-ENG-48. 11p. (CONF-830719—49). NTIS, PC A02/MF A01. Order Number DE83017366.

From American Physical Society meeting on shock waves in condensed media; Santa Fe, NM, USA (18 Jul 1983).

We have used the SHIVA laser system to accelerate carbon disks to speeds in excess of 100 km/sec. The 3KJ/3 ns pulse, on a 1 mm diameter spot of a single disk produced a conventional shock of about 5 MB. The laser energy can, however, be stored in kinetic motion of this accelerated disk and delivered (reconverted to thermal energy) upon impact with another carbon disk. This collision occurs in a time much shorter than the 3 ns pulse, thus acting as a power amplifier. The shock pressures measured upon impact are estimated to be in the 20 MB range, thus demonstrating the amplification power of this colliding disk technique in creating ultra-high pressures. Theory and computer simulations of this process will be discussed, and compared with the experiment.

55316 **(UCRL—89769) Thermal barriers: their purpose and functioning.** Baldwin, D.E. (Lawrence Livermore National Lab., CA (USA)). 29 Aug 1983. Contract W-7405-ENG-48. 23p. (CONF-830909—5). NTIS, PC A02/MF A01. Order Number DE83017365.

From Course and workshop on mirror-based and field-reversed approaches to magnetic fusion; Varenna, Italy (7 Sep 1983).

This review covers the following topics: (1) thermal barrier formation, (2) ion pumping, (3) high-field throttle coil, and (4) microstability. (MOW)

55317 **Classical theory of the bumpy torus relativistic annulus.** Hamasaki, S.; Krall, N.A.; Sperling, J.L. (JAYCOR, San Diego, CA (USA)). *Nuclear Fusion;* **23**: No. 5, 571-596(May 1983).

The relativistic electron annulus is a critical component of the bumpy torus magnetic fusion concept. An analysis of the annulus is presented in which the ring steady state is determined by the explicit balance of quasi-linear heating and classical losses, i.e. collisions and synchrotron radiation. Both anisotropy and loss-cone effects are included in the formalism. It is demonstrated that a large number of electron cyclotron harmonics, not just the first and second, contribute in an appreciable way to annulus steady state and power balance. Without a loss cone, the analysis reproduces the relativistic passing electron population observed in bumpy tori on confined drift surfaces near the centre of the bumpy torus cross-section. Loss-cone effects permit an annulus population with large perpendicular pressure to exist. It is shown that the balance between quasi-linear heating and the classical losses cannot account for the experimental scaling of bumpy torus annulus temperature; therefore, processes not included in the classical ring power balance model must contribute in a non-trivial way to observed annulus properties.

55318 **Parameter optimizations of multiple-mirror reactors.** Najmabadi, F. (California Univ., Berkeley (USA). Dept. of Electrical Engineering and Computer Sciences); Lichtenberg, A.J.; Lieberman, M.A. (California Univ., Berkeley (USA). Electronics Research Lab.). *Nuclear Fusion;* **23**: No. 5, 609-631(May 1983).

The diffusion density profile model for multiple-mirror devices is limited to machines with a large number of cells and high mirror ratios. A new discrete staircase density profile model, without those limitations, has been developed. This model, along with the diffusion model, has been used to study the parameters of steady-state multiple-mirror reactors. A linear fusion device consisting of a central solenoid and multiple mirrors at each end has been considered. The magnetic field is taken to be produced by a solenoid and mirror-quadrupole assemblies which produce an average-minimum-B stable configuration. Different means of supplying the re-circulating power, including high-energy neutral-D injectors, are considered. Distribution functions of alpha particles and beam particles in this machine have been calculated. Trade-offs among the length of the machine, Q is identical to fusion power/beam power, and other machine parameters in two different operating modes: wetwood burner (pure-T plasma background) and conventional (T and D background plasma) have been studied. It is found that the staircase density profile results in shorter reactors with a larger number of cells, compared to those of the diffusion-determined density profile.

55319 **Finite-aspect-ratio MHD equations for tokamaks.** Strauss, H.R. (New York Univ., NY (USA). Courant Inst. of Mathematical Sciences). *Nuclear Fusion;* **23**: No. 5, 649-655(May 1983).

A consistently ordered set of reduced MHD equations is derived for finite-aspect-ratio tokamaks. The equations correctly reproduce Mercier's low-beta interchange stability criterion. A numerical application to tokamak ballooning stability is given. Finite-aspect-ratio effects tend to be stabilizing at low beta and destabilizing at high beta.

55320 **Design of a helical-axis stellarator.** Yoshikawa, S. (Princeton Univ., NJ (USA). Plasma Physics Lab.). *Nuclear Fusion;* **23**: No. 5, 667-669(May 1983).

Letter-to-the-editor.

A simple coil system is found to be sufficient for providing a helical-axis stellarator configuration with a deep vacuum magnetic well and short connection length. A system similar to the one reported here may provide good confinement for thermonuclear plasmas.

55321 **Articulated limiter blade for a tokamak fusion reactor.** Doll, D.W. US Patent Application 6-435,791. 21 Oct 1982. 25p. Contract AC02-76CH03073.

A limiter blade for a large tokomak fusion reactor includes three articulated blade sections for enabling the limiter blade to be adjusted for plasmas of different sizes. Each blade section is formed of a rigid backing plate carrying graphite tiles coated with titanium carbide, and the limiter blade forms a generally elliptic contour in both the poloidal and toroidal directions to uniformly distribute the heat flow to the blade. The limiter blade includes a central blade section movable along the major radius of the vacuum vessel, and upper and lower pivotal blade sections which may be pivoted by linear actuators having rollers held to the back surface of the pivotal blade sections.

55322 **High-voltage R-F feedthrough bushing.** Grotz, G.F. US Patent Application 6-414,543. 3 Sep 1982. 17p. Contract AC02-76CH03073.

Described is a multi-element, high voltage radio frequency bushing for transmitting rf energy to an antenna located in a vacuum container. The bushing includes a center conductor of complex geometrical shape, an outer coaxial shield conductor, and a thin-walled hollow truncated cone insulator disposed between central and outer conductors. The shape of the center conductor, which includes a reverse curvature portion formed of a radially inwardly directed shoulder and a convex portion, controls the uniformity of the axial surface gradient on the insulator cone. The outer shield has a first substantially cylindrical portion and a second radially inwardly extending truncated cone portion.

55323 **(KFK-tr—685) Production of intensive beams of hydrogen anions.** Dimov, G.I. (AN SSSR, Novosibirsk. Inst. Yadernoj Fiziki). Sep 1982. Translation of IYaF—81-98, 1981, 22p. 34p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83781139.

Translated from Russian.

For the production of negative ions it is now feasible to apply their formation during the interaction of fast particles with a gas, of a cold plasma with a gas and of particles with the surface of a solid. Therefore three basic techniques for the generation of intensive negative hydrogen ions are worked out: the recharging technique, the plasma technique and the surface technique. The surface technique has several modifications: the thermo-emission technique, the secondary emission technique, surface conversion technique and the surface-plasma technique. Of these surface techniques the surface plasma technique seems to be the most feasible for the generation of intensive beams.

99 GENERAL AND MISCELLANEOUS

9901 Management

55324 (NIRS-AR—21) Annual report of National Institute of Radiological Sciences of the fiscal year 1978. (National Inst. of Radiological Sciences, Chiba (Japan)). 1979. 234p. (In Japanese). NTIS (US Sales Only), PC A11/MF A01. Order Number DE83703103.

In FY 1978, the budget of the National Institute of Radiological Sciences was more than 3,368 million yen, and increased by 456 million yen as compared with the previous year. The laboratory for late occurring injuries commenced to function fully, and it is expected to produce useful results in the investigation concerning the estimation of danger of the late occurring injuries due to radiation. The investigation concerning the environmental radiation exposure due to nuclear facilities was newly started in 1978. The investigation concerning the medical utilization of cyclotrons progressed successively to the previous year, and the number of patients subjected to fast neutron treatment reached 432 as of the end of FY 1978. The production and utilization of short life radioisotopes were carried out smoothly, and the development of positron emission GT has been under way. Many papers were published in Japan and foreign countries by the researchers, and many persons took parts in various international meetings. In this report, the activities of various research divisions and the works concerning technical aid, training, therapy, the management of Nakaminato branch office, publication and general affairs are described. Also, the appendices showing the records of activities are attached.

55325 (NIRS-AR—22) Annual report of National Institute of Radiological Sciences of the fiscal year 1979. (National Inst. of Radiological Sciences, Chiba (Japan)). 1980. 268p. (In Japanese). NTIS (US Sales Only), PC A12/MF A01. Order Number DE83703104.

The activities of the National Institute of Radiological Sciences were carried out on the basis of the budget of about 3,835 million yen and 419 regular staffs. In order to promote the investigation concerning the evaluation of injuries due to internal exposure, the construction of a new laboratory was approved as four-year plan beginning in this year. The total budget is 5,916 million yen. The primates laboratory became usable for the investigation concerning the estimation of danger of the heredity injuries due to radiation. The investigation concerning the environmental radiation exposure due to nuclear facilities started in the last year progressed smoothly. The investigation concerning the medical utilization of cyclotrons was completed in the last year, and the investigation concerning the medical utilization of particle accelerators was started in this year. The number of patients subjected to fast neutron treatment reached 550 as of the end of FY 1979. Also head positron CT was completed. In this report, the activities of various research divisions and the works concerning technical aid, training, therapy, the management of Nakaminato branch office, publication and general affairs are described. Also, the appendices showing the records of activities are attached.

55326 (NP—3770407) VEBA-report on activities in 1980. (VEBA A.G., Duesseldorf (Germany, F.R.)). 1981. 92p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83770407.

Portions are illegible in microfiche products.

A description of the structure and activities of this big undertaking is given. The aim of the understanding is to erect, operate and acquire power-generating and distributing plants, mining and metallurgical plants, plants in the chemical and petroleum industries, trade and shipping businesses and other enterprises. This survey of the business year 1980 contains the report of the supervisory board, the report of the board of directors, as well as the annual statements of accounts for VEBA AG and the VEBA group as per December 31st, 1980.

55327 (PNL-SA—10382) Management of QA in an R and D organization. Ryder, D.E. (Pacific Northwest Lab., Richland, WA (USA)). Jun 1983. Contract AC06-76RL01830. 7p. (CONF-830535—3). NTIS, PC A02/MF A01. Order Number DE83016924.

From 37. annual American Society for Quality Control congress; Boston, MA, USA (24 May 1983).

Application of more formal QA-system principles and practices are slowly but surely becoming a fact of life for many of the nation's R and D organizations. As an example, the US Department of Energy (DOE) in 1981 issued an order to its field offices that involved requirements for the assurance of quality achievement in DOE programs. This paper will provide useful information based upon actual experience in the development and implementation of an R and D QA Program at a national laboratory. It will include a discussion of the R and D product (data), primary QA concerns, management of the QA program and QA organization, QA planning, and contributions that QA personnel can make to the R and D effort.

9902 Mathematics And Computers

REFER ALSO TO CITATION(S) 54730, 54982, 55221

55328 (CEA-N—2314) Introduction to numerical analysis. Bonnet, M. (CEA Centre d'Etudes de Limeil, 94 - Villeneuve-Saint-Georges (France)). Sep 1982. 64p. (In French). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83703472.

Modelling physical systems lead to solve difficult mathematical problems. Numerical analysis is the mean to solve these problems using computers. In these lectures we introduce general ideas about main topics: the Finite Element method, the solution of linear systems and the study of finite difference schemes. A list of references will help those who want to lock deeply into some subjects.

55329 (CEA-N—2322) Minimal features of a computer and its basic software to execute NEPTUNIX 2 numerical step. Roux, Pierre. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). Dec 1982. 18p. (In French). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703473.

NEPTUNIX 2 is a package which carries out the simulation of complex processes described by numerous non-linear algebraic-differential equations. Main features are: non-linear or time dependent parameters, implicit form, stiff systems, dynamic change of equations leading to discontinuities on some variables. Thus the mathematical model is built with an equation set $F(x,x',t,l) = 0$, where t is the independent variable, x' the derivative of x and l an "algebrized" logical variable. The NEPTUNIX 2 package is divided into two successive major steps: a non numerical step and a numerical step. The non numerical step must be executed on a series 370 IBM computer or a compatible computer. This step generates a FORTRAN language model picture fitted for the computer carrying out the numerical step. The numerical step consists in building and running a mathematical model simulator. This execution step of NEPTUNIX 2 has been designed in order to be transportable on many computers. The present manual describes minimal features of such host computer used for executing the NEPTUNIX 2 numerical step.

55330 (CONF-810188—1-Draft) Problems involved in the computer identification of replicate entries in TOXLINE. Hummel, D.J.; Schultheisz, R.J.; Atkins, D. (National Library of Medicine, Washington, DC (USA); Oak Ridge National Lab., TN (USA)). 1981. Contract W-7405-ENG-26. 15p. NTIS, PC A15/MF A01. Order Number DE83017212.

From ACS symposium on aids to use of multiple online files; Washington, DC, USA (7 Jan 1981).

Programs are described which are designed to eliminate duplicate records from the TOXLINE data base. (GHT)

55331 (CONF-830492—1) Comments on ISO/TC 97/SC 18/WG3 N120. Mason, J.D. (Oak Ridge National Lab., TN (USA)). 1983. Contract W-7405-ENG-26. 3p. NTIS, PC A02/MF A01. Order Number DE83011391.

From Association Francaise de Normalisation (AFNOR) meeting; Paris, France (12 Apr 1983).

The structure of documents that office systems must deal with is considered in comments on a draft international standard for computer languages for processing text.

55332 **(CONF-830577—4) Participation of VAX VMS computers in IBM file-transfer networks.** Raffenetti, R.C. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 12p. NTIS, PC A02/MF A01. Order Number DE83017945.

From Digital Equipment Computer Users Society (DECUS) symposium; St. Louis, MO, USA (23 May 1983).

Communications software written at Argonne National Laboratory enables VAX VMS computer systems to participate as end nodes in a standard IBM file-transfer network. The software, which emulates the IBM Network Job Entry (NJE) protocol, has been in use at Argonne for over two years, and is in use at other installations. The basic NJE services include transfer of print and punch files, job submittal, execution of remote commands, and transmission of user-to-user messages. The transmit services are asynchronous to the user's VMS session and received files are automatically routed to a designated user directory. Access to files is validated according to the VMS protection mechanism. New features which were added recently include application level software to transfer general, sequential files and to bridge the electronic mail systems of VMS and VM/CMS. This paper will review the NJE emulator and describe the design and implementation of the sequential file transfer service. The performance of the emulator will be described. Another paper at this symposium will describe the mail bridge.

55333 **(CONF-830899—3) Estimation of the ridge constant: an approach based on the condition index.** Carnes, B.A.; Ginevan, M.E.; Eychner, D.M. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 18p. NTIS, PC A02/MF A01. Order Number DE83017955.

From Annual meeting of American Statistical Association and other statistical groups; Toronto, Canada (15 Aug 1983).

Portions are illegible in microfiche products.

A Monte Carlo simulation was conducted to evaluate the response of ridge regression solutions to increasing collinearity. Specifically, the magnitude of the ridge constant was sensitive to variability in the response vector while appearing insensitive to collinearity. The insensitivity to collinearity was especially apparent when the response vector was oriented toward a minor dimension in the structure of the predictor variables. Limit arguments indicated that, in the minor dimension case, the increasing magnitude of the inner product of the least squares coefficient vector in the denominator of the optimum estimate for the ridge constant was responsible for the insensitivity to collinearity. Since ridge regression was proposed to deal with collinearity, this behavior suggests a defect in the generally used estimate for the optimum ridge constant. To solve this problem, we propose a condition index estimate for the ridge constant based on the eigenvalues of the augmented X'X matrix; this approach ensures sensitivity to collinearity and insensitivity to the behavior of the response vector.

55334 **(DOE/ER/01195—475) FASTBUS diagnostic language. Reference manual for the Unibus process interface, Version 1A(15).** Abraham, S.; Lesny, D.D.; Nater, K.D. (Illinois Univ., Urbana (USA). Dept. of Physics). Sep 1982. Contract AC02-76ER01195. 64p. (COO—1195-475). NTIS, PC A04/MF A01. Order Number DE83018131.

FDL is a diagnostic software tool for FASTBUS systems and modules. Since FASTBUS includes a miscellany of devices, it is appropriate to develop a diagnostic language rather than specific diagnostic programs. FDL gives the engineer or physicist tools to quickly develop appropriate test procedures for new equipment and networks. A small number of extensions are provided to control FASTBUS in non-diagnostic situations.

55335 **(DOE/ER/01195—478) FASTBUS Diagnostic Language users manual. Version 3(74).** Lesny, D. (Illinois Univ., Urbana (USA). Dept. of Physics). Jul 1983. Contract AC02-76ER01195. 168p. (COO—1195-478). NTIS, PC A08/MF A01. Order Number DE83017932.

FASTBUS Diagnostic Language (FDL) is an interactive interpretive language designed to aid the engineer or physicist/user in the testing and debugging of FASTBUS modules and systems. Since FASTBUS systems involve a variety of devices and data paths, it is frequently more efficient to utilize a high-level language system such as FDL for diagnostics, rather than to develop device-specific programs. FDL can also be used to a limited extent for both device control and data acquisition.

55336 **(JINR—R-11-82-459) Index algorithm for forming approximation function in the least square method.** Churakov, A.K.; Volkov, N.G.; Kononenko, G.A.; Tsupko-Sitnikov, V.M. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1982. 5p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703099.

An algorithm using indexation for approximation function and their parameter vector formation in the Least Square Method (LSM) for minimization problems is suggested. This algorithm permits optimal approximation of the experimental results using one program. The algorithm is especially effective for data processing when approximation is needed with several different functions or similar functions but with different sets of fixed and variable parameters (Moessbauer spectroscopy, electron conversion spectra etc.).

55337 **(KIYI—81-27) ASSEMBLER program group for preliminary data processing on-line with ES-1010.** Pshenichnyj, V.A.; Gritsaj, E.A. (AN Ukrainskoj SSR, Kiev. Inst. Yadernykh Issledovanij). 1981. 44p. (In Russian). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83703100.

The paper deals with programs on the ASSEMBLER language for processing of physical data, obtained in a time-of-flight neutron spectrometer. A program which provides the connection between a measuring room with a computer is given. There are also auxilliary programs for spectra processing recorded on a magnetic disk, spectra plotting and for calculation of areas under peaks for a γ-spectrum ed on a magnetic disk, spectra plotting and for cal.

55338 **(LA—9770-MS) Linked-state machines.** Knudsen, H.K. (Los Alamos National Lab., NM (USA)). Jul 1983. Contract W-7405-ENG-36. 86p. NTIS, PC A05/MF A01. Order Number DE84000123.

Procedures for the analysis and design of linked state machines are developed in this report. These procedures are for the study of the finite state nondeterministic, and possibly concurrent, processes that arise in models of communication protocols, digital hardware, and computer programs. Linked state machines (LSMs) are currently used for description (for example, specification) of protocols and hardware but are not widely used for analysis and design. This study develops tools for analysis and design by formulating mathematical descriptions of LSMs, developing methods for generating different representations of LSMs, and developing a method of reduction that allows the behavior of a selected part of an LSM to be modeled. The relationship between LSMs and Petri nets is also studied. In addition, conditions that allow the synthesis of speed independent LSMs are stated and proved. The procedures developed for the analysis and design of LSMs are mostly algorithmic and can be applied to the (hand) analysis of (some) systems with several hundred states. These procedures also will serve as a basis for computer-aided analysis and design of LSMs.

55339 **(SAND—83-1265) DRAMIN: transferring data from the Applicon graphic system to a DRAM input file. User guide.** Bopp, W.B.; Erickson, P.A. (Sandia National Labs., Albuquerque, NM (USA)). 29 Jun 1983. Contract AC04-76DP00789. 16p. NTIS, PC A02/MF A01. Order Number DE83018235.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This document defines the procedure for linking a CAD graphics file to a mechanism program through a software translator. Included are instructions for appending data to an Applicon AGS 880 graphics file which can be processed through DRAMIN to produce an output file suitable for engineering analysis using DRAM.

55340 **(SAND—83-1945C) Computerized manufacturing: the impact of high technology implication for the work force.** Plomp, P.W. (Sandia National Labs., Albuquerque, NM (USA)). Oct 1983. Contract AC04-76DP00789. 50p. NTIS, PC A03/MF A01. Order Number DE83017826.

This transcript of a television interview includes 24 photographs illustrating applications of computer-aided manufacturing, and its impact on the workforce and productivity. (GHT)

55341 **(SAND—83-8029) Computerized art plotting system. Vol. I. Horizontal bar charts (second edition).** Yano, H.; Sabo, N.A. (Sandia National Labs., Livermore, CA (USA)). Sep 1983. Contract AC04-76DP00789. 16p. NTIS, PC A02/MF A01. Order Number DE83018113.

Instructions are given for creating horizontal bar charts using the VAX2 computer, a VT-100 terminal, a Tektronix 4014 terminal, and a COBOL program based on the DISSPLA plotting package. The charts are of high quality and suitable for reports, journal articles, Vu-Graphs, and 35-mm slides.

55342 **(UCRL—89754) Time-series models with many discrete alternatives.** Durst, M. (Lawrence Livermore National Lab., CA (USA)). Aug 1983. Contract W-7405-ENG-48. 13p. NTIS, PC A02/MF A01. Order Number DE83017607.

In process and inventory control, time-series models occur with discrete alternatives in each time period (e.g., in an inventory process, the alternatives of no loss, or a block loss, in each period). With such a model, a fully Bayesian approach requires that the number of possible alternatives increase geometrically with time. In this paper, the problem of discarding the large set of alternatives which turn out to be (on the basis of the data) wildly unlikely is discussed from a fully Bayesian viewpoint. Costs of computation are compared with two sources of costs of truncating the model. Algorithms are given for the selection of the set of alternatives to retain. Simplified guidelines for practical situations are given.

9903 Information Handling

REFER ALSO TO CITATION(S) 53501, 53502, 54237, 55163

55343 **(DOE/TIC/EGC—83/3) Energygrams: brief descriptions of energy technology.** Simpson, W.F. Jr. (ed.). (USDOE Technical Information Center, Oak Ridge, TN). 1983. 62p. (PB—83-903603). NTIS $8.00 single copy (subscription item).

This is a quarterly compilation of technical notes (called Energygrams) published by the Technical Information Center. The Center routinely screens all DOE R and D reports to identify appropriate information. It also coordinates with DOE and DOE laboratory and contractor program managers in identifying research and development projects for the transfer program and in reviewing the technical content of Energygrams before publication. Energygrams are usually one-page illustrated bulletins describing DOE technology or data and telling how to obtain the technical reports, patent documents, software or other material on which they are based. The compilation is organized by subject categories, and, within each category, Energygrams are presented alphabetically by Energygram title. The subject index is cumulated with each issue by calender year.

55344 **(PB—83-213843) Chemical selection methods: an annotated bibliography - second edition. Toxics integration information series (final).** Meyer, D.E.; Halpin, V.L. (Tracor Jitco, Inc., Rockville, MD (USA)). Mar 1983. 63p. NTIS, PC A04/MF A01.

Persons interested in the control of toxic chemicals have examined and are examining methods to select chemicals of concern from the universe of chemical substances. Chemical selection refers to such activities as priority-setting, ranking, indexing, and sorting. These efforts have included the development of various systematic selection methods, such as scoring systems. This annotated bibliography is intended to provide brief summaries of a variety of chemical selection methods.

9905 Civilian Defense

55345 **(AD-A—126652/7) IDA/BPT crisis relocation planning model: description, documentation and user's guide to the computer program. Final report.** Pearsall, E.S.; Bushnell, R.C. (Institute for Defense Analyses, Arlington, VA (USA). Program Analysis Div.). 22 Dec 1982. 95p. NTIS, PC A05/MF A01.

This report describes work performed by Bushnell, Pearsall and Trozzo, Inc., under subcontract with the Institute for Defense Analyses on Task A-1 of IDA Contract No. EMW-0749 with the Federal Emergency Management Agency. Task A-1 calls for the development of a model to simulate population movement during an evacuation from the risk area to the various host areas over a transportation network. This report describes, documents and provides a user's guide to a system of computer routines which perform the various computations required to apply a crisis relocation model developed jointly by IDA and BPT, Inc. The computer routines together comprise an interactive system resident on the FEMA Univac 1108 facility. The model and its attached national data base can be used to analyze in detail the evacuation.

55346 **(AD-A—128795/2) Soviet crisis relocation program. Final report 1 May 82-Jun 83.** Goure, L. (Science Applications, Inc., McLean, VA (USA). Center for Soviet Studies). May 1983. 266p. (SAI—84-166-WA). NTIS, PC A12/MF A01.

This report describes and analyzes, on the basis of open Soviet source materials, Soviet civil defense concepts, plans, organization, priorities, training programs, and capabilities pertaining to crisis relocation of residents of high-risk urban areas and workers of significant economic installations. Soviet sources indicate not only that crisis relocation continues to be an important element of the Soviet civil defense program, but also that there is a requirement for the relocation of leadership elements, essential workers, and urban civil defense forces regardless of the availability of shelters in the cities. Soviet civil defense has well developed, comprehensive plans for implementing a rapid relocation of the urban population of exurban areas in a highly organized and strictly controlled manner. While small-scale evacuation exercises are conducted throughout the USSR, it is uncertain how well Soviet plans, organization, and procedures will perform in an actual large-scale relocation.

55347 **(AD-A—128969/3) Industrial hardening: 1982 technical status report. Final report.** Zaccor, J.V.; Smith, G.W.; Bernard, R.D. (Scientific Service, Inc., Redwood City, CA (USA)). May 1983. 192p. (SSI—8145-12). NTIS, PC A09/MF A01.

This report presents the results of the second year of a five-year program to improve and augment a self-help program in disaster preparedness for industry. Under this program, industrial protection guidelines have been developed to enable U.S. industry to reduce its vulnerability. Follow-on work addressed the vulnerability to the complete gamut of emergencies - from day-to-day emergencies (industry's main concern) to nuclear attack - as a strategy to induce industry to adopt an integrated all-hazards preparedness program. Most important has been the problem of how to influence industry to apply the countermeasures developed; the specific method applied has been strong contractor participation in a local mutual aid group consisting of industrial and governmental agencies concerned with developing more effective response to community emergencies. This approach has been extremely successful in improving information exchange and in developing preparedness concepts that fit the FEMA strategy of an integrated emergency management system approach. The report summarizes the present status of these efforts.

55348 **(AD-A—129140/0) Some ecological contexts of attitudes concerning issues of civil defense. Final report.** Nehnevajsa, J. (Pittsburgh Univ., PA (USA). University Center for Social and Urban Research). Mar 1983. 280p. NTIS, PC A13/MF A01.

The examination of six clusters of major issues bearing public credibility and acceptance of national civil defense prepared-

ness are examined in terms of the geo-ecological context of the residential area. They include public perception of threat, survivability, civil defense costs, the implementation of crisis relocation programs, general attitudes toward crisis relocation, and claims regarding willingness to act. The key differences among respondents from counties characterized as more and less well-to-do may be summarized as: Less well-to-do counties estimate the likelihood of war, the chances of survival both in fallout and blast shelters, the current and desirable investment in civil defense, the intention to evacuate spontaneously and relocate upon recommendation by the President, and compliance with instructions where to go at higher levels than do more well-to-do counties. On the other hand, more well-to-do counties find the target and fallout danger, likelihood of Presidential decision to relocate and the associated increment to spontaneous evacuation, and likelihood of adaptive spontaneous evacuation higher than those respondents in less well-to-do counties. Residents of high risk areas (TR-82) tend to recognize this as they perceive the target danger at higher levels than do residents of low risk areas.

CORPORATE AUTHOR INDEX

In the Corporate Index, report literature is indexed using the name of the organization or institution responsible for issuing the report. Headings are provided for all report literature and for published literature for which a corporate approach is especially desirable, e.g., symposium and conference proceedings.

Each entry under a corporate heading gives the document title and the volume and abstract numbers. The document type, e.g., R for Report; country of publication, e.g., US; and language of the document, e.g., In German; are given in parentheses at the end of the entry. If no language statement appears, the language is English. Tables of document types and country of publication codes appear after the indexes.

DOE Energy Information Data Base: Corporate Author Entries (DOE/TIC-4585) is used in the standardization of corporate entries. DOE/TIC-4585 is available for purchase from the National Technical Information Service (NTIS), U. S. Department of Commerce, Springfield, Virginia 22161.

A

Acurex Corp., Mountain View, CA (USA)
Development of mass-producible line-focus tracking concentrating solar collectors - Category 1: collectors. Final report, 8:53819 (R;US)

Advanced Solar Components, Inc., Brockton, MA (USA)
Advanced Solar Components Inc. Final report, 8:53818 (R;US)

Aerospace Corp., El Segundo, CA (USA). Aerophysics Lab.
F^2 boundary layer measurement in a chemical laser slit nozzle flow. Technical report, 8:54492 (R;US)
F-atom depletion in Nf^3 combustor laser flows. Technical report, 8:54494 (R;US)
Pulsed chemical laser with variable-pulse-length electron-beam initiation and magnetic confinement. Technical report Nov 79-Apr 80, 8:54505 (R;US)

Aerospace Corp., El Segundo, CA (USA). Space Sciences Lab.
Ir spectral signatures of the millrace debris cloud. Technical report, 8:54784 (R;US)

Air Force Engineering and Services Center, Tyndall AFB, FL (USA)
Study of factors affecting soot formation in a swirl-stabilized combustor. Final report 22 Jan 80-30 Sep 82, 8:53443 (R;US)

Air Force Geophysics Lab., Hanscom AFB, MA (USA)
Magnetohydrodynamic modelling of interplanetary disturbances between the sun and earth. Environmental research papers, 8:55092 (R;US)

Air Force Inst. of Tech., Wright-Patterson AFB, OH (USA)
Electron scattering from silicon 30. Master's thesis, 8:54269 (R;US)

Air Force Inst. of Tech., Wright-Patterson AFB, OH (USA). School of Engineering
Calculation of late-time surface burst EMP (electromagnetic pulse) fields using a time-independent numerical method. Master's thesis, 8:54755 (R;US)
Characterization of laser beam quality. Master's thesis, 8:54495 (R;US)
Simulation of a passive solar energy system. Master's thesis, 8:53799 (R;US)

Akademie der Wissenschaften der DDR, Leipzig. Zentralinstitut fuer Isotopen- und Strahlenforschung
Joint annual report 1981, 8:55164 (R;DD;In German)
Report of the Central Institute for Isotope and Radiation Research, 8:53728 (R;DD)
Report of the Central Institute for Isotope and Radiation Research, 8:53729 (R;DD)

Akron Univ., OH (USA). Inst. of Polymer Science
Fracture toughness of polybutadiene at cryogenic temperatures. Technical report, 8:54266 (R;US)

Alabama Univ., Huntsville (USA). Kenneth E. Johnson Environmental and Energy Center
Commercial energy costs for SOLCOST data bank cities, Winter 1982-1983, 8:54105 (R;US)

Alaska Univ., Fairbanks (USA). Inst. of Marine Science
Bathymetry of Alaskan arctic lakes: a key to resource inventory with remote-sensing methods, 8:54933 (R;US)
Pipeline haul-road investigations north of the Brooks Range, 8:54941 (R;US)

American Hospital Association, Chicago, IL
Project to analyze the potential energy and cost savings of changes in the DHHS: minimum requirements of construction and equipment for hospital and medical facilities, 8:54136 (R;US)

American Solarhol Corp., Baltimore, MD
Brewing industry potential for the immediate and near-term production of fuel-grade ethyl alcohol. Final report, 8:53743 (R;US)

Ames Lab., IA (USA)
Amorphous silicon-carbon films, 8:54274 (R;US)
Analytic diffraction corrections to ultrasonic scattering measurements, 8:54535 (R;US)
Clamping force of heat-shrinkable fittings, 8:54368 (R;US)
Effects of crack closure on ultrasonic transmission, 8:54537 (R;US)
Effects of dissipation in one-dimensional inverse problems, 8:55223 (R;US)
Elastic-wave inverse scattering in non-destructive evaluation, 8:54531 (R;US)
Elastic-wave scattering from multiple voids (porosity), 8:54536 (R;US)
Electrical conductivities of polycrystalline and single-crystal Er_2O_3-stabilized hafnia, 8:54256 (R;US)
Equations of state for the alkali metals, with generalizations to NaCl, 8:54276 (R;US)
Inverse Born Approximation: exact determination of shape of convex voids, 8:54532 (R;US)
Life prediction under stress corrosion conditions below K/sub ISCC/, 8:54215 (R;US)
Mineral recovery from coal-conversion solid wastes, 8:53387 (R;US)
Moessbauer spectroscopy study of amorphous $Fe_{87}B_{11}Au_2$ ribbon and its crystallization products, 8:54216 (R;US)
New developments and opportunities for NMR in metal-hydrogen systems, 8:55218 (R;US)
Phonon density of states of amorphous silicon, 8:54277 (R;US)
Phonon dispersion of transverse basal-plane modes in alkali-graphite compounds, 8:54253 (R;US)
Piston-displacement equations of state for sodium, potassium, and rubidium metals to 20 kbar from 300 K to 4 K, 8:54275 (R;US)
Progress on ultrasonic flaw sizing in turbine-engine rotor components: bore and web geometries, 8:54534 (R;US)
Ultrasensitive optical rotation and refractive-index measurements, 8:54294 (R;US)
Ultrasonic 3-D reconstruction of inclusions in solids using the inverse Born algorithm, 8:54533 (R;US)

Amt der Salzburger Landesregierung (Austria)
Alternative sources of energy, 8:54111 (R;AT;In German)

Anderson and Associates, Inc., Blacksburg, VA (USA)
Coal train movements through the city of Wilmington, North Carolina, 8:53397 (R;US)

AN SSSR, Novosibirsk. Inst. Yadernoj Fiziki
Production of intensive beams of hydrogen anions, 8:55323 (TG;DE;In German)

AN Ukrainskoj SSR, Kharkov. Fiziko-Tekhnicheskij Inst.
Development and investigation of electromagnetic characteristics for modifications of accelerating structure of heavy ion linear accelerator, 8:54565 (R;SU;In Russian)
AN Ukrainskoj SSR, Kiev. Inst. Yadernykh Issledovanij
ASSEMBLER program group for preliminary data processing on-line with ES-1010, 8:55337 (R;SU;In Russian)
Scheme of stepmotor control, 8:54762 (R;SU;In Russian)
Applied Research Associates, Inc., South Royalton, VT (USA). New England Div.
Effect of strain rate and stress corrosion on the long-term strength of crystalline rocks. Final report, 8:55080 (R;US)
Arbeitsgemeinschaft Versuchs-Reaktor G.m.b.H., Juelich (Germany, F.R.)
AVR-pebble-bed reactor: Core-physics control without incore-instrumentation, 8:53887 (R;XA)
Argonne National Lab., Idaho Falls, ID (USA)
Neutron irradiation and compatibility testing of Li_2O, 8:55283 (R;US)
Argonne National Lab., IL (USA)
100% alignment of hydrogen excited states in beam-foil spectroscopy, 8:55108 (R;US)
a-c losses of 19-strand subcables for the ANL 3.3-MJ coil, 8:54471 (R;US)
Analysis of the KUCA MEU experiments using the ANL code system, 8:53964 (R;US)
Analytical study of using cadmium burnable absorbers in LEU fuel elements, 8:53958 (R;US)
Application features and considerations in advanced lead-acid and nickel/iron EV batteries, 8:54047 (R;US)
Assessment of gamma-inject logging techniques for the determination of residual oil saturation. Final report, 8:53431 (R;US)
Automated low-background alpha-counting system with large-area silicon detector, 8:54673 (R;US)
Burnup-dependent cross-section data for research reactors, 8:53957 (R;US)
CEREAS: an interactive computer-mapping system for environmental assessments, 8:53439 (R;US)
Comparative response of lead-acid and nickel/iron batteries to pulsed and constant-current loads, 8:54046 (R;US)
Consequences of shorted turns in a superconducting magnet, 8:54472 (R;US)
Current status of the RERTR Program, 8:53959 (R;US)
Current status of the US RERTR Program, 8:53963 (R;US)
Energy storage criteria handbook. Final report mar 81-jun 82, 8:54125 (R;US)
Enhanced test facility for OTEC at Keahole Point, 8:53794 (R;US)
Estimation of the ridge constant: an approach based on the condition index, 8:55333 (R;US)
Fabrication of UO_2-stainless steel fuel for a fast-reactor safety test, 8:54020 (R;US)
Florida statewide coal-conversion study: coal-supply and transportation analysis, 8:53859 (R;US)
Functional requirements for an Exercise Evaluation and Simulation Facility, 8:54022 (R;US)
High-sensitivity mass spectrometry with a tandem accelerator, 8:54603 (R;US)
Hydrogen-generating reactions in LWR severe accidents, 8:54019 (R;US)
Improved estimates of sulfate dry deposition in eastern North America, 8:54879 (R;US)
Industrial waste exchange: a mechanism for saving energy and money, 8:54074 (R;US)
Inland-transport modes for coal and coal-derived energy: an evaluation method for comparing environmental impacts, 8:53411 (R;US)
Measurements, in vivo, of parameters of the dopamine system, 8:54972 (R;US)
Meson-exchange Hamiltonian for NN scattering and isobar-nucleus dynamics, 8:55145 (R;US)
Neutron irradiation and compatibility testing of Li_2O, 8:55283 (R;US)
Neutronics and thermal-hydraulics analysis of KUHFR, 8:53961 (R;US)
NO/sub x/ information book, 8:54903 (R;US)
Nucleon-nucleon interactions and polarized-beam (both proton & antiproton) facilities at LAMPF II, 8:55135 (R;US)
Parametric study of LH current drive for FED-A, 8:55237 (R;US)
PARET code and the analysis of the SPERT I transients, 8:54017 (R;US)
Participation of VAX VMS computers in IBM file-transfer networks, 8:55332 (R;US)
Performance and fuel-cycle cost comparisons with HEU and LEU fuels, 8:53955 (R;US)
Physics of reactor safety. Quarterly report, April-June 1983. Volume II, 8:54033 (R;US)
Proceedings of the 1982 summer workshop on proton decay experiments, 8:55123 (R;US)
Quest for ultimate reality and meaning: a scientist's view, 8:54057 (R;US)
Reduced-enrichment fuel alternatives for the JAERI reactors, 8:53960 (R;US)
Relativistic-beam Pickup Test Facility, 8:54574 (R;US)
RERTR program progress in qualifying reduced-enrichment fuels, 8:53962 (R;US)
Self-pumping impurity by in-situ metal deposition, 8:55281 (R;US)
Solid-oxide fuel cells, 8:54117 (R;US)
Solid-oxide fuel-cell performance, 8:54120 (R;US)
Spallation and 14-MeV neutron irradiation of stabilized NbTi superconductors, 8:55282 (R;US)
Status of RERTR fuel demonstrations, 8:53956 (R;US)
Steam-generating collectors, 8:53815 (R;US)
US INTOR radiation-shield design, 8:55262 (R;US)
Arizona Univ., Tucson (USA)
Physical-chemical treatment of tar-sand processing wastewater, 8:53462 (R;US)
Price, socioeconomic, and climatic influences on residential water use in southern arizona. Completion report, October 1980-September 1981, 8:54068 (R;US)
Arizona Univ., Tucson (USA). Dept. of Metallurgical Engineering
Characterization and processing of coal fired copper reverberatory flue dusts. Open file report 1 October 80-30 September 82, 8:54172 (R;US)
Arizona Univ., Tucson (USA). Dept. of Mining and Geological Engineering
Rock mass sealing: experimental assessment of borehole plug performance. Annual report, June 1982-May 1983, 8:53657 (R;US)
Armed Forces Radiobiology Research Inst., Bethesda, MD (USA)
Safety analysis of modifications to upgrade the reactor ventilation system at Armed Forces Radiobiology Research Institute. Technical report, 8:53954 (R;US)
Army Aviation Engineering Flight Activity, Edwards AFB, CA (USA)
Fuel conservation evaluation of US Army helicopters. Part 5. Ah-1S flight testing. Final report, 31 July-21 September 1982, 8:54148 (R;US)
Army Construction Engineering Research Lab., Champaign, IL (USA)
Analysis of energy conservation alternatives for standard Army building. Final report, 8:54128 (R;US)
Army Engineer Waterways Experiment Station, Vicksburg, MS (USA). Structures Lab.
Petrographic examination of Bell Canyon Tests (BCT) 1-FF field grouts over a three-year period, 8:53645 (R;US)
Army Materials and Mechanics Research Center, Watertown, MA (USA)
Corrosion evaluation of stove pipe materials and surface treatments. Final report, 8:54126 (R;US)
Atomic Energy Control Board, Ottawa, Ontario (Canada)
Approach for determining the acceptable levels of nuclear risk, 8:54072 (R;CA)
Auburn Univ., AL (USA)
Solvent tailoring in coal liquefaction. Quarterly report, May 1982-August 1982, 8:53338 (R;US)
Solvent tailoring in coal liquefaction. Quarterly report, August 1982-November 1982, 8:53339 (R;US)
Solvent tailoring in coal liquefaction. Quarterly report, February 1982-May 1982, 8:53340 (R;US)
Auburn Univ., AL (USA). Coal Conversion Lab.
Cooperative investigation by Auburn University and Cities Service Research and Development Company of combined coal and heavy-resid processing. Quarterly report, January 15, 1983-April 15, 1983, 8:53345 (R;US)
Improving the quality of deteriorated recycle solvents. Quarterly report, August 1982-November 1982, 8:53343 (R;US)
Solvent tailoring in coal liquefaction. Quarterly report, November 1982-February 1983, 8:53341 (R;US)

Australian Atomic Energy Commission Research Establishment, Lucas Heights
Assessment of overseas developments in methods for treatment and disposal of high-level radioactive wastes, 8:53601 (R;AU)
Australian Radiation Lab., Melbourne
Dose contribution due to photonuclear reactions during radiotherapy, 8:54998 (R;AU)
Environmental radiation at the Monte Bello Islands from nuclear weapons tests conducted in 1952 and 1956, 8:54919 (R;AU)
Evaluation of the radiation doses to uranium mine employees exposed to external gamma radiation, 8:54999 (R;AU)
Examination of the distribution of patient doses from diagnostic x-ray procedures, 8:55002 (R;AU)
Aveo-Everett Research Lab., Everett, MA (USA)
1000-hour MHD anode test: executive summary, May-August 1981, 8:54114 (R;US)

B

Battelle Columbus Labs., OH (USA)
Analysis of lead-acid battery accelerated testing data. Final report, 8:54050 (R;US)
Durability of marker materials for nuclear waste isolation sites, 8:53670 (R;US)
Examining relationships between coal characteristics and the performance of TVA power plants. Final report, 8:53861 (R;US)
Long-term performance of materials used for high-level waste packaging. Quarterly report, April-June 1983, 8:53656 (R;US)
Battelle Memorial Inst., Columbus, OH (USA). Office of Nuclear Waste Isolation
Performance assessment of a shaft seals system in a HLW repository in the Gibson Dome area, 8:53673 (R;US)
Battelle-Northwest, Richland, WA (USA). Pacific Northwest Lab.
Preliminary assessment of the use of heat transfer fluids for solar thermal energy systems. Final report May 81-Apr 82, 8:53763 (R;US)
Battelle Pacific Northwest Labs., Richland, WA (USA)
Guide for radiological characterization and measurements for decommissioning of US Department of Energy surplus facilities, 8:53643 (R;US)
Bayerisches Oberbergamt, Muenchen (Germany, F.R.)
1980 annual report of the Bavarian Mines Inspectorate, 8:53401 (R;DE;In German)
Bechtel Group, Inc., San Francisco, CA (USA)
Design of advanced fossil-fuel systems (DAFFS). A study of three developing technologies for coal-fired, base-load electric power generation. Steam-cooled pressurized fluidized-bed power plant, 8:53856 (R;US)
Design of advanced fossil-fuel systems (DAFFS). A study of three developing technologies for coal-fired, base-load electric power generation. Air-cooled pressurized fluidized-bed power plant, 8:53857 (R;US)
Bendix Field Engineering Corp., Grand Junction, CO (USA)
Bibliography of Utah radioactive occurrences. Volume II, 8:53465 (R;US)
Bibliography of Utah radioactive occurrences. Volume I, 8:53464 (R;US)
Bendix Field Engineering Corp., Grand Junction, CO (USA). Grand Junction Operations
Model for water factor measurements with fission-neutron logging tools. National Uranium Resource Evaluation, 8:54781 (R;US)
Bergakademie Freiberg (German Democratic Republic). Sektion Physik
Joint annual report 1981, 8:55164 (R;DD;In German)
Berkeley Research Associates, Springfield, VA (USA)
Quantitative study of magnetic flux transport on the sun, 8:55088 (R;US)
BioTechnology, Inc., Falls Church, VA (USA)
Task analysis of nuclear-power-plant control-room crews, 8:53945 (R;US)
Task analysis of nuclear-power-plant control-room crews: project approach methodology, 8:53944 (R;US)
Bonneville Power Administration, Portland, OR (USA)
Issue backgrounder: the health impacts of home weatherization, 8:54134 (R;US)
Boston Coll., Chestnut Hill, MA (USA). Dept. of Physics
Electron beam-induced electromagnetic waves in a magnetospheric plasma. Technical report, 8:55099 (R;US)
Bradford Univ. (UK). Dept. of Chemical Engineering
Mineral recovery from coal-conversion solid wastes, 8:53387 (R;US)
Brigham Young Univ., Provo, UT (USA)
Separation of selected cations by liquid membranes. Progress report, 1 December 1982-31 August 1983, 8:54292 (R;US)
British Steel Corp., London
Fatigue crack growth and fracture resistance of steels in high-pressure hydrogen environments. Final report, 8:54211 (R;XE)
Bronx Frontier Development Corp., NY (USA)
Commercial wind energy conversion systems (wecs) monitoring and utility impacts study. Final report, 8:53850 (R;US)
Brookhaven National Lab., Upton, NY (USA)
AGS polarized proton project, 8:54597 (R;US)
Algorithm for reconstruction of count-rate curves from total counts, 8:54291 (R;US)
Annotated bibliography covering generation and use of evaluated cross section uncertainty files, 8:55160 (R;US)
Apparatus for contact reaction, 8:54490 (TG;US)
Application of photothermal techniques for trace detection of NO_2 in the troposphere, 8:54878 (R;US)
Automation of a cryogenic facility by commercial process-control computer, 8:54374 (R;US)
Brookhaven Double MP Facility - recent developments and plans for the future, 8:54596 (R;US)
Characterization of Alloy 600 surfaces after exposure to a caustic environment, 8:54208 (R;US)
Chemical/hydrogen energy systems multi-year R and D plan, 8:53734 (R;US)
Combined cold compressor/ejector helium-refrigerator cycle, 8:54376 (R;US)
Comparison of the various test methods for studying the hydrogen sensitivity of steels used for storage and transport of hydrogen gas. Final report, June 1, 1980-November 30, 1982, 8:54246 (TG;US)
DAMOS: a data and modelling system for energy policy analysis, 8:54083 (R;US)
Design calculations for a gas pipeline for the transport of solar-produced hydrogen over large distances taking non-stationary operating conditions into account, 8:53737 (TG;US)
Effects of continuous-background irradiance on xenon-flash-induced fluorescence yields in marine microalgae, 8:54967 (R;US)
Electron transfer around photosystem I in cyanobacterial heterocyst membranes, 8:54966 (R;US)
Health and environmental effects document for photovoltaic energy systems, 1982, 8:53788 (R;US)
Health impacts of productive conservation in urban transportation. Tapcut technical memorandum No. 27, 8:54149 (R;US)
Helium refrigerator with features for supercritical-pressure cooling, 8:54375 (R;US)
Helium-flow measurement using ultrasonic technique, 8:54633 (R;US)
Intense positron beams and possible experiments, 8:55106 (R;US)
Interference effects in the quasimolecularen K-radiation induced in collisions of hydrogen-like ions, 8:55105 (R;DE;In German)
Magnetic field measurements of superconducting magnets for the colliding beam accelerator, 8:54632 (R;US)
Model for superheated debris-bed quench for severe-accident containment calculations, 8:53986 (R;US)
Neutrino-oscillation experiments at Brookhaven National Laboratory, 8:55127 (R;US)
NO/sub x/ information book, 8:54903 (R;US)
Nuclear power plants: structure and function, 8:53867 (R;US)
Physico-chemical fracturing and cleaning of coal, 8:53412 (R;US)
Problem of magnet ramping, 8:54634 (R;US)
Progress in lattice gauge theory, 8:55157 (R;US)
Resonance behavior in the presence of space charge, 8:54575 (R;US)
Review of coal-supply models and forecasts: a critique of the current state-of-the-art, 8:54090 (R;US)

Review of DOE waste package program. Subtask 1.1. National waste package program, October 1982-March 1983. Vol. 4, 8:53652 (R;US)
Review of waste package verification tests. Semiannual report, October 1982-March 1983, 8:53653 (R;US)
Spectrometer coupled to an electron storage ring for tagging laser backscattered gamma rays, 8:54631 (R;US)
Thermohydraulics in a high-temperature gas-cooled reactor primary loop during early phases of unrestricted core-heatup accidents, 8:53985 (R;US)
Universality and fractal dimension of mode locking structure in systems with competing periodicities, 8:55217 (R;US)
Warm measurements of CBA superconducting magnets, 8:54576 (R;US)

Brown, Boveri und Cie A.G., Mannheim (Germany, F.R.)
Instrumentation of an HTR and its environmental conditions, 8:53884 (R;XA)
Task and the technique of temperature instrumentation of HTR's, 8:53878 (R;XA)

Brown Univ., Providence, RI (USA)
Neutrino-oscillation experiments at Brookhaven National Laboratory, 8:55127 (R;US)

Bundesgesundheitsamt, Neuherberg (Germany, F.R.). Inst. fuer Strahlenhygiene
Strontium-90 in the teeth of Bavarian children, 8:55044 (R;DE;In German)

Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)
Central heat pump units - problems of heat output control, 8:54129 (R;DE;In German)
Interference effects in the quasimolecularen K-radiation induced in collisions of hydrogen-like ions, 8:55105 (R;DE;In German)

Bundesministerium fuer Handel, Gewerbe und Industrie, Vienna (Austria)
Concept for supplying Austria with mineral raw- and primary material, 8:54066 (R;AT;In German)
Importance and possibilities of secondary cycles (recycling), substitution and innovation in mineral raw and primary material supply, 8:54065 (R;AT;In German)
International developments on the sector of mineral raw material, 8:54067 (R;AT;In German)
Storage sites of solid mineral raw materials in Austria and their importance, 8:54063 (R;AT;In German)
Use and resources of mineral raw material, statistical data on the raw material supply of Austria, 8:54064 (R;AT;In German)

Bureau of Mines, Washington, DC (USA). Div. of Minerals Health and Safety Technology
Annual report of the Secretary of Labor under the Federal Mine Safety and Health Act of 1977, fiscal year 1979. Volume 2. Mining health and safety research and development, 8:53403 (R;US)

Bureau of Reclamation, Denver, CO (USA). Engineering and Research Center
Automatic generation controller for Flatiron Dispatch Center-Laramie River Power station remote terminal unit, 8:53753 (R;US)

Burt-Hill-Kosar-Rittelmann Associates, Washington, DC (USA)
Energy strategy selector for small office building design, 8:54145 (R;US)

C

Cairo Univ., Giza (Egypt). Dept. of Electrical Engineering
Effect of magnetic bending on the high-frequency stability of the ELMO Bumpy Torus, 8:55240 (R;US)

California Inst. of Tech., Pasadena (USA)
Microprobe analyses of rare-earth-element fractionation in meteoritic minerals, 8:55094 (R;US)

California State Univ., Fullerton (USA)
Microprobe analyses of rare-earth-element fractionation in meteoritic minerals, 8:55094 (R;US)

California State Univ., Northridge (USA)
Studies of solar flares and erupting filaments. Final report 1 Jul 76-30 Sep 81, 8:55087 (R;US)

California Univ., Berkeley (USA). Operations Research Center
Generalized network flow model with application to power supply-demand problems, 8:54103 (R;US)

California Univ., Berkeley (USA). Seismographic Station
Regional discrimination with broadband data. Final report 1 Oct 81-30 Sep 82, 8:54873 (R;US)

California Univ., Irvine (USA)
Neutrino-oscillation experiments at Brookhaven National Laboratory, 8:55127 (R;US)

California Univ., Los Angeles (USA). School of Public Health
Methanogenesis from acetate, a key intermediate in nature. Third year report, 8:54979 (R;US)

California Univ., San Diego, La Jolla (USA). Inst. of Pure and Applied Physical Sciences
Experimental study of resonance radiation trapping as a method of gain improvement for efficient power extraction from the XeF blue-green laser transition. Final technical report 1 Jan 80-30 Sep 81, 8:54504 (R;US)

California Univ., Santa Cruz (USA)
Nuclear physics problems for accreting neutron stars, 8:55095 (R;US)

California Univ., Santa Cruz (USA). Dept. of Biology
Respiration of roots. Response to low O_2 stress. Final report, 8:54981 (R;US)

Cardon Instrument Co., Colchester, Essex (UK)
Low-jitter, hydrogen thyratron Pockels cell driver, 8:55309 (R;US)

CEA Centre d'Etudes de Limeil, 94 - Villeneuve-Saint-Georges (France)
Damage threshold measurements at 1.06 μm at Centre d'Etudes de Limeil, 8:55259 (R;FR)
Introduction to numerical analysis, 8:55328 (R;FR;In French)

CEA Centre d'Etudes Nucleaires de Cadarache, 13 - Saint-Paul-les-Durance (France)
Internal core catcher in Super Phenix, 8:53987 (R;FR)

CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France)
Tests of health physics detectors and dosimeters to 6 and 9 MeV gamma-radiation, 8:54671 (R;FR;In French)

CEA Centre d'Etudes Nucleaires de Grenoble, 38 (France)
Equations governing the liquid-film flow over a plane with heat flux and interfacial phase change, 8:54529 (TG;US)

CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)
Acoustic control system BN-350. Explanatory note, 8:53951 (TG;FR;In French)
Contribution to the minimization of time for the solution of algebraic differential equations system, 8:55230 (R;FR;In French)
Minimal features of a computer and its basic software to execute NEPTUNIX 2 numerical step, 8:55329 (R;FR;In French)
One nanosecond resolution time-to-digital converter, 8:54669 (R;FR)
Proton nuclear scattering radiography, 8:54971 (R;FR)
Radiography system enabling clear images to be obtained with an X ray dose less than 1/10th of that employed in conventional radiography, 8:54978 (TG;FR;In French)
Study of a large scale neutron measurement channel, 8:54670 (R;FR;In French)
Use of a transport equation for the dynamical behaviour of the nuclear fission, 8:55197 (R;FR)

Centec Corp., Reston, VA (USA)
Assessment of energy-efficiency improvements for paint spray booths, 8:54162 (R;US)

Central Electricity Generating Board, Berkeley (UK). Berkeley Nuclear Labs.
Fuel failure detection and location methods in CAGRs, 8:53889 (R;XA)

Central Electricity Generating Board, London (UK)
Safety engineering: KTA Code of Practice. Lifting mechanisms in nuclear plant, 8:53933 (TG;GB)

Centre d'Etude de l'Energie Nucleaire, Mol (Belgium)
High temperature measurement by noise thermometry, 8:53881 (R;XA)

Centro para el Desarrollo Tecnologico Industrial, Madrid (Spain)
Genetic engineering in biotechnology, 8:53781 (R;US)
Photovoltaic conversion of solar energy, 8:53780 (R;US)

C-E Power Systems, Windsor, CT (USA)
Evaluation and demonstration of methods for improved fuel utilization. Seventh semi-annual progress report, October 1, 1982-March 31, 1983, 8:53874 (R;US)

Chuo Univ., Tokyo (Japan)
Nox abatement for stationary sources in Japan. Final report, January 1982-January 1983, 8:54561 (R;US)
SO_2 abatement for coal-fired boilers in Japan. Final report Jun 81-Jan 83, 8:54905 (R;US)
Clark Univ., Worcester, MA (USA)
Cogeneration project - Clark University. Integrated Community Energy System, 8:54186 (R;US)
Clemson Univ., SC (USA). Dept. of Electrical and Computer Engineering
Investigation of accelerated stress factors and failure/degradation mechanisms in terrestrial solar cells. Fourth annual report, 8:53775 (R;US)
Coastal Engineering Research Center, Fort Belvoir, VA (USA)
Annotated bibliography on the biological effects of constructing channels, jetties, and other coastal structures. Miscellaneous report, 8:54939 (R;US)
Coast Guard Research and Development Center, Groton, CT (USA)
Surface drifter study - Beaufort Sea, Alaska. Final report, 8:53437 (R;US)
Colorado Office of the Governor, Denver (USA)
Feasibility of co-disposing low-level radioactive waste with uranium mill tailings and/or FUSRAP waste, 8:53644 (R;US)
Colorado Univ., Boulder (USA)
High-energy photoproduction of states containing heavy quarks and other rare phenomena, 8:55137 (R;US)
Colorado Univ., Boulder (USA). Dept. of Astro-Geophysics
Plasma wave turbulence and particle heating caused by electron beams, radiation, and pinches. Annual interim report 1 Oct 81-30 Sep 82, 8:55097 (R;US)
Columbia Univ., Palisades, NY (USA). Lamont-Doherty Geological Observatory
Plutonium, cesium, uranium, and thorium series radionuclides in the Hudson River estuary and other environments. Annual technical progress report, December 1, 1982-November 30, 1983, 8:54952 (R;US)
Comitato Nazionale per l'Energia Nucleare, Frascati (Italy)
Acceleration experiments at low power density, 8:55293 (R;IT)
Commission of the European Communities, Luxembourg
Assessment of plutonium internal contamination in man, 8:55041 (R;XE)
Design, construction and testing of a gas engine driven high temperature industrial heat pump. Final report, 8:54170 (R;US)
Pilot test facility. phase I. Final report, 8:53805 (R;US)
Presentation of the software for central control system I of the solar pilot test facilities. volume III. Final report, 8:53806 (R;US)
Small angle neutron scattering study of the damage induced by creep deformation in AISI 304 stainless steel, 8:54238 (R;US)
Studies on parameterization of global, diffuse and direct solar radiation. Final report, 8:53757 (R;US)
Study and evaluation of the latent cooling potential of chemical de-humidifiers. Final report, 8:53803 (R;US)
United kingdom solar pilot test facility. the design, construction and first phase of operation. Final report, 8:53807 (R;US)
Compagnie Generale des Matieres Nucleaires (COGEMA), Centre de Marcoule, 30 - Bagnols-sur-Ceze (France)
Glass and nuclear wastes, 8:53606 (R;FR;In French)
Vitrification processes for fission product solutions, 8:53605 (R;FR;In French)
Connecticut Dept. of Transportation, Wethersfield (USA). Bureau of Planning and Research
Passive solar-heating retrofit of a maintenance facility: first-year performance. Research report may 81-jun 82, 8:53804 (R;US)
Cornell Univ., Ithaca, NY (USA)
Exciton-laser amplifier. Interim technical report, 8:54508 (R;US)
Study of a nuclear gamma-ray laser. Interim technical report, 8:54506 (R;US)
Cornell Univ., Ithaca, NY (USA). Dept. of Theoretical and Applied Mechanics
Lectures on mathematical combustion. Lecture 6. Cellular flames. Interim technical report, 8:54356 (R;US)
Lectures on mathematical combustion. Lecture 8. Counterflow diffusion flames. Interim technical report, 8:54358 (R;US)
Lectures on mathematical combustion. Lecture 10. Free-boundary problems. Interim technical report, 8:54360 (R;US)
Lectures on mathematical combustion. Lecture 3. General deflagrations. Interim technical report, 8:54353 (R;US)
Lectures on mathematical combustion. Lecture 2. Governing equations, asymptotics, and deflagrations. Interim technical report, 8:54352 (R;US)
Lectures on mathematical combustion. Lecture 1. Pre-asymptotic combustion revisited. Interim technical report, 8:54351 (R;US)
Lectures on mathematical combustion. Lecture 7. Pulsating flames. Interim technical report, 8:54357 (R;US)
Lectures on mathematical combustion. Lecture 9. Spherical diffusion flames. Interim technical report, 8:54359 (R;US)
Lectures on mathematical combustion. Lecture 5. Stability of the plane deflagration wave. Interim technical report, 8:54355 (R;US)
Lectures on mathematical combustion. Lecture 4. SVFS and NEFS. Interim technical report, 8:54354 (R;US)
Corps of Engineers, St. Paul, MN (USA). St. Paul District
Lock and Dam 1, Mississippi River, Minneapolis - St. Paul, Minnesota. Reconnaissance report for hydropower. Preliminary report, 8:53751 (R;US)
Lock and Dam 7 Mississippi River near La Crosse, Wisconsin. Reconnaissance report for hydropower. Preliminary report, 8:53749 (R;US)
Reconnaissance report for hydropower, Lock and Dam 8, Mississippi River. Preliminary report, 8:53748 (R;US)
Reconnaissance report for hydropower, Lock and Dam number 2, Mississippi River. Preliminary report, 8:53750 (R;US)
CSI Resource Systems, Inc., Washington, DC (USA)
Analysis of the financial impacts to the industrial energy user of using coal or municipal solid waste in a new process-steam-generating plant, 8:54185 (R;US)

D

D'Appolonia Consulting Engineers, Inc., Pittsburgh, PA (USA)
Evaluation of clays and clay minerals for application to repository sealing, 8:53672 (R;US)
Defence Research Establishment, Ottawa, Ontario (Canada)
Cadmium telluride detectors for gamma dose-rate meters, 8:54645 (R;US)
Shakedown and preliminary calibration tests for the fuel engine evaluation system using the Km914A Sachs Rotary Combustion Engine. Technical note, 8:54196 (R;US)
Defense Atomic Support Agency, Washington, DC (USA)
Relative apparent radii of craters in various soils, 8:54868 (R;US)
Summary of SHERWOOD activities, 8:55233 (R;US)
Defense Intelligence Agency, Washington, DC (USA). Directorate for Scientific and Technical Intelligence
Bibliography of Soviet laser developments number 57, January-February 1982, 8:54493 (R;US)
Bibliography of soviet laser developments, number 58, March-April 1982, 8:54503 (R;US)
Delaware Univ., Newark (USA). Dept. of Chemical Engineering
Kinetics and mechanism of catalytic hydroprocessing of components of coal-derived liquids. Sixteenth quarterly report, February 16, 1983-May 15, 1983, 8:53366 (R;US)
De Leuw, Cather and Co., Chicago, IL (USA)
Comparative analysis study of alternative transit systems - South Hills Corridor. Final report, 8:54152 (R;US)
Department of Energy, Pittsburgh, PA (USA). Pittsburgh Energy Technology Center
Direct hydrogenation and solvent extraction of coal, 8:53334 (R;US)
Department of Labor, Washington, DC (USA)
Annual report of the Secretary of Labor under the Federal Mine Safety and Health Act of 1977, fiscal year 1979. Volume 1, 8:53402 (R;US)
Annual report of the Secretary of Labor under the Federal Mine Safety and Health Act of 1977, fiscal year 1980. Volume 1, 8:53405 (R;US)
Department of National Health and Welfare, Ottawa, Ontario (Canada)
Occupational radiation exposures in Canada - 1979, 8:55040 (R;CA;In English, French)

Department of Supply and Services, Ottawa, Ontario (Canada). Bureau of Management Consulting
Approach for determining the acceptable levels of nuclear risk, 8:54072 (R;CA)
Department of the Interior, Washington, DC (USA). Office of the Secretary
Annual report and achievements 1975, 8:53406 (R;US)
Bureau of Mines coal mining health and safety research and development. 1976 annual report and achievements, 8:53408 (R;US)
Bureau of Mines coal mining, health and safety, research and development. 1975 annual report and achievements, 8:53404 (R;US)
Deutsches Elektronen-Synchrotron (DESY), Hamburg (Germany, F.R.)
Dsup(*+-) production by e^+e^- annihilation near 34.4 GeV C.M. energy, 8:55136 (R;DE)
Lattice QCD with light quark masses: Does chiral symmetry get broken spontaneously, 8:55146 (R;DE)
Deutsche Verbundgesellschaft e.V., Heidelberg (Germany, F.R.)
DVG report 1981, 8:54102 (R;DE;In German)
Dorr-Oliver, Inc., Stamford, CT (USA)
Energy recovery from pretreatment of industrial wastes in the anaerobic fluidized bed process, 8:54158 (R;US)
Drilling Research Lab., Inc., Salt Lake City, UT (USA)
Program for the improvement of downhole drilling motor bearings and seals. Phase V. Final report, 8:53836 (R;US)
Duke Univ., Durham, NC (USA)
High-energy physics progress report, 1983-1984, 8:55138 (R;US)
Duncan, Lagnese and Associates, Inc., Pittsburgh, PA (USA). Industrial Waste Section
Treatment of coke plant wastewaters in packed bed reactors, 8:53383 (R;US)
Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.
Effectiveness of bromicide against Legionella pneumophila in a cooling tower, 8:55070 (R;US)
Helium damage in austenitic stainless steels, 8:54210 (R;US)
Duquesne Light Co., Pittsburgh, PA (USA)
Quarterly operating report, Second quarter 1983, 8:53873 (R;US)
Dynecology, Inc., Harrison, NY (USA)
Gasification of Simplex briquets: briquet production. Vol.1. Final report, 8:53346 (R;US)
Gasification of Simplex briquets: demonstration in the General Electric high-pressure gasifier. Vol.2. Final report, 8:53347 (R;US)

E

Earth Satellite Corp., Washington, DC (USA)
Utilization of snow-enhancement techniques for acquisition of geological and geo-environmental information from ERTS imagery, 8:55079 (R;US)
EG and G Idaho, Inc., Idaho Falls (USA)
Experimental data report for Semiscale Mod-2B Power-Loss Test Series (Tests S-PL-1, -2, and -3), 8:54034 (R;US)
Eidgenoessisches Inst. fuer Reaktorforschung, Wuerenlingen (Switzerland)
'Modal Splits' for safeguarding Switzerland's energy supply until the year 2000, 8:54056 (R;CH;In German)
Eimco Mining Machinery International, Salt Lake City, UT (USA)
Hydrogen engine induction technique for backfire-free operation. Contract research report Apr 81-May 82, 8:53738 (R;US)
Electricity Council Research Centre, Capenhurst (UK)
Calculations of the temperature rise of overhead distribution connectors, 8:53865 (R;US)
Guidelines for assessing overview line connectors using infra-red thermovision, 8:53864 (R;US)
EM Design, Dublin, CA (USA)
Air-breakdown limits for microwave-pulse propagation. Part I. Experiments, 8:54553 (R;US)
Emory Univ., Atlanta, GA (USA). Dept. of Chemistry
Characterization of polynuclear aromatic compounds in petroleum-refining localities. Progress report, September 1, 1982-November 30, 1983, 8:54880 (R;US)
Energotechnology Corp., Cambridge, MA (USA)
Reclaiming lost capability in power plant coal conversions: an innovative, low-cost approach. Final report, 8:53858 (R;US)
Energy Impact Associates, Inc., Pittsburgh, PA (USA)
NO/sub x/ information book, 8:54903 (R;US)
Energyworks, Inc., West Newton, MA (USA)
Massachusetts Home Energy Rating System Project, 8:54143 (R;US)
Engineering Decision Analysis Co., Inc., Palo Alto, CA (USA)
Seismic evaluation of headframe and associated equipment, 8:53661 (R;US)
Ensco, Inc., Springfield, VA (USA)
Locomotive data acquisition package. Volume 5. Locomotive Analysis Software Package: user's guide. Final report Apr 81-Jan 82, 8:54153 (R;US)
Environmental Protection Agency, Ann Arbor, MI (USA)
EPA (Environmental Protection Agency) evaluation of the P.A.S.S. kit device under Section 511 of the Motor Vehicle Information and Cost Savings Act. Technical report, 8:54201 (R;US)
Environmental Protection Agency, Cincinnati, OH (USA). Municipal Environmental Research Lab.
Hazardous waste landfill research, 8:54910 (R;US)
Environmental Protection Agency, Cincinnati, OH (USA). Office of Environmental Criteria and Assessment
Health assessment document for manganese. External review draft, 8:55071 (R;US)
Environmental Protection Agency, Research Triangle Park, NC (USA). Environmental Monitoring and Systems Lab.
National Performance Audit Program. Ambient air audits of analytical proficiency, 1981, 8:54904 (R;US)
Environmental Protection Agency, Research Triangle Park, NC (USA). Environmental Sciences Research Lab.
Atlas of source emission particles, 8:54876 (R;US)
Determination of good-engineering-practice stack height: a fluid mode demonstration study for a power plant, 8:53860 (R;US)
Environmental Protection Agency, Washington, DC (USA). Effluent Guidelines Div.
Development document for effluent limitations guidelines and standards for the battery manufacturing point source category, 8:54958 (R;US)
ERA Technology Ltd., Leatherhead (UK)
Benefits to industry of improved efficiency motors. Final report, 8:54165 (R;US)
Erevanskij Fizicheskij Inst. (USSR)
Characteristics of ionization chambers filled with nitrogen, 8:54677 (R;SU;In Russian)
Unified system of collection, processing of experimental information and control, 8:54678 (R;SU;In Russian)
ERTEC, Inc., Long Beach, CA (USA)
Potentiometric-level monitoring program - Mississippi and Louisiana: annual status report for Fiscal Year 1982, 8:53671 (R;US)
European Organization for Nuclear Research, Geneva (Switzerland)
Cedar counters for particle identification in the SPS secondary beams: A description and an operation manual, 8:54672 (R;XC)
Compilation of radiation damage test data. Pt. 3. Materials used around high-energy accelerators, 8:54272 (R;XC;In English, French)
Workshop on SPS fixed-target phsics in the years 1984-1989. Vol. 1. Proceedings, 8:55133 (R;XC)
Evaluation Research Corp., Oak Ridge, TN (USA)
Estimates of internal-dose equivalent from inhalation and ingestion of selected radionuclides, 8:55046 (R;US)
Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)
Determination of baseline levels of toxic nonradioactive substances at the ICPP, 8:53648 (R;US)
Determination of low specific activity iodine-129 off-gas concentrations by GC separation and negative ionization mass spectrometry, 8:53647 (R;US)
ICPP 1st-quarter 1983 effluent-monitoring report. Supplement 1, 8:53646 (R;US)

F

Faucett (Jack) Associates, Inc., Chevy Chase, MD (USA)
Energy emergency handbook, 8:54055 (R;US)
Federal Railroad Administration, Washington, DC (USA). Office of Research and Development
LASP: Locomotive Analysis Software Package. Software, 8:54154 (R;US)
Fermi National Accelerator Lab., Batavia, IL (USA)
High-energy photoproduction of states containing heavy quarks and other rare phenomena, 8:55137 (R;US)
Fish and Wildlife Service, Bowling Green, KY (USA). East Central Reservoir Investigations
Effects of reservoir releases on water quality, macroinvertebrates, and fish in tailwaters: field study results. Final report, 8:53755 (R;US)
Forest Service, Broomall, PA (USA). Northeastern Forest Experiment Station
Use of recording watt/varmeter to evaluate the electrical power requirements of a combination edger. General technical report (final), 8:54169 (R;US)
Foster Wheeler Development Corp., Livingston, NJ (USA)
Design of advanced fossil-fuel systems (DAFFS). A study of three developing technologies for coal-fired, base-load electric power generation. Steam-cooled pressurized fluidized-bed power plant, 8:53856 (R;US)
Design of advanced fossil-fuel systems (DAFFS). A study of three developing technologies for coal-fired, base-load electric power generation. Air-cooled pressurized fluidized-bed power plant, 8:53857 (R;US)
Frankfurt Univ. (Germany, F.R.). Inst. fuer Kernphysik
Interference effects in the quasimolecularen K-radiation induced in collisions of hydrogen-like ions, 8:55105 (R;DE;In German)
Friedrich-Schiller-Universitaet, Jena (German Democratic Republic). Sektion Physik
Joint annual report 1981, 8:55164 (R;DD;In German)

G

Gas-Cooled Reactor Associates, San Diego, CA (USA)
Economic evaluation of the steam-cycle high-temperature gas-cooled reactor, 8:53910 (R;US)
GA Technologies, Inc., San Diego, CA (USA)
Applying process-control techniques to a research environment: on-line controls & instrumentation for Doublet III fusion project, 8:55292 (R;US)
Low-activation fusion-reactor design studies, 8:55291 (R;US)
Minimum-thickness low-activation toroidal field coil concept for tokamak reactors, 8:55290 (R;US)
Nuclear design of a very-low-activation fusion reactor, 8:55289 (R;US)
General Electric Co., Philadelphia, PA (USA). Advanced Energy Programs Dept.
Photovoltaic-module bypass-diode encapsulation. Annual report, 8:53777 (R;US)
General Electric Co., Pittsfield, MA (USA). Power Transformer Dept.
Compact gas-insulated transformer. Fourteenth quarterly report, 8:53854 (R;US)
General Electric Co., Schenectady, NY (USA)
Recent development of high-power visible laser sources employing solid-state slab lasers and nonlinear harmonic conversion techniques. Technical information series, 8:54496 (R;US)
General Electric Co., Schenectady, NY (USA). Advanced Energy Programs Dept.
Electrocyclone Development Program. Quarterly technical report, November-January 1982, 8:54557 (R;US)
Electrocyclone Development Program. Quarterly technical report, February-April 1982, 8:54558 (R;US)
General Electric Co., Schenectady, NY (USA). Corporate Research and Development Center
Computed tomography of coals. Quarterly technical progress report No. 2, November 28, 1982-March 6, 1983, 8:53367 (R;US)
General Electric Co., Schenectady, NY (USA). Electric Utility Systems Engineering Dept.
Effects of future energy scenarios on photovoltaic energy value, 8:53761 (R;US)
General Physics Corp., Columbia, MD (USA)
Task analysis of nuclear-power-plant control-room crews: project approach methodology, 8:53944 (R;US)
Task analysis of nuclear-power-plant control-room crews, 8:53945 (R;US)
Geochem Research, Inc., Houston, TX (USA)
Development of an improved method for the analysis of pressure-core samples. Final report, 8:53432 (R;US)
Geological Survey, Menlo Park, CA (USA)
Geothermal hydrology of Warner Valley, Oregon: a reconnaissance study, 8:53829 (R;US)
Relation of mercury, uranium, and lithium deposits to the McDermitt caldera complex, Nevada-Oregon, 8:53466 (R;US)
Geological Survey, Menlo Park, CA (USA). Water Resources Div.
Stability of relocated stream channels. Final report, January 1978-December 1980, 8:54956 (R;US)
Geological Survey, Sacramento, CA (USA)
Regional and local networks of horizontal control, Cerro Prieto Geothermal Area, Mexico, 8:53833 (R;US)
Geological Survey, Tallahassee, FL (USA). Water Resources Div.
Water resources of Manatee County, Florida. Water-resources investigations, 8:54069 (R;US)
Georgia Inst. of Tech., Atlanta (USA). School of Civil Engineering
Treatment of phenol with an innovative fluidized bed activated carbon anaerobic filter, 8:54940 (R;US)
Georgia Inst. of Tech., Atlanta (USA). School of Physics
Structure and reactivity of heterogeneous surfaces and study of the geometry of surface complexes. Progress report, January 1, 1983-December 31, 1983, 8:54307 (R;US)
Georgia Univ., Athens (USA). Dept. of Physics
Study of mechanism of hydrogen diffusion in separation devices. Progress report for 1980-1983, 8:53730 (R;US)
Gesellschaft fuer Reaktorsicherheit m.b.H. (GRS), Garching (Germany, F.R.)
List of reports concerning reactor safety research from BMFT, CEA, EPRI, JSTA, and USNRC, 8:54024 (R;DE;In German)
Gesellschaft fuer Schwerionenforschung m.b.H., Darmstadt (Germany, F.R.)
Search for flow in the reaction Ar + Pb, 8:55194 (R;US)
Gesellschaft fuer Strahlen- und Umweltforschung m.b.H. Muenchen, Neuherberg (Germany, F.R.). Inst. fuer Strahlenschutz
Radioecology, 8:54923 (R;DE;In German)
GKSS-Forschungszentrum Geesthacht G.m.b.H., Geesthacht-Tesperhude (Germany, F.R.)
Magnetic, Moessbauer effect, and neutron small angle scattering measurements on iron clusters in A-zeolites, 8:54214 (R;DE;In German)
Studies on fluid impurities due to accidents in the containment of PWR reactors, 8:54023 (R;DE;In German)
Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii
BIPRUS code, 8:53937 (R;SU;In Russian)
Combined method of elements in solving the gas kinetic equation of neutron transport, 8:53898 (R;SU;In Russian)
Derivation of the finite difference equations for a heterogeneous reactor. 2. Square, triangular and double reactor lattices, 8:53915 (R;SU;In Russian)
Determination of radiation heating in a critical assembly, 8:53916 (R;SU;In Russian)
Forms of self-supporting relations in the electric power engineering in the presence of nuclear power plants, 8:53911 (R;SU;In Russian)
Graphics display devices for an information measurement system of a research reactor, 8:53936 (R;SU;In Russian)
Program for neutron group calculation of a plane periodical reactor cell using the difference analog of the surface pseudosource method NEGR-PR, 8:53917 (R;SU;In Russian)
Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Teoreticheskoj i Ehksperimental'noj Fiziki
Calculating the thermal neutron fields in polycells with "black" blocks using the one-velocity p3-approximation and Monte-Carlo method, 8:53965 (R;SU;In Russian)
Deuteron production in proton-nucleus interactions at 7.5 GeV/c, 8:55183 (R;SU;In Russian)

Masses, decay modes and lifetimes of charmed particles, 8:55143 (TG;DE)
Software for the AIST measurement and calculational complex. Service routines for editing and statistical processing files on a magnetic tape, 8:53939 (R;SU;In Russian)
Threshold Cherenkov counter, 8:54692 (R;SU;In Russian)
Unit of high-speed decimal scaler with computer indication and control, 8:54691 (R;SU;In Russian)

Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk. Fiziko-Ehnergeticheskij Inst.
Adaptation of the NF-6 complex programs to the ARAMAKO constants, 8:53896 (R;SU;In Russian)
Capabilities of the BRAND program complex for simulating the neutron-physical experiments by the Monte-Calo method, 8:53914 (R;SU;In Russian)
Impurities diffusion in uranium: cobalt diffusion, 8:54212 (R;SU;In Russian)
Reactivity meter for collective use on the base of the Electronica-100I computer, 8:53928 (R;SU;In Russian)
Study of iron self-diffusion in gamma-phase field of iron-chromium binary system, 8:54213 (R;SU;In Russian)

Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij
Apparatus for measuring the polarization in charge-exchange reactions, 8:54680 (R;SU;In Russian)
Calculation of muonic fields in the vicinity of high-energy proton accelerators, 8:54606 (R;SU;In Russian)
Electronic read-out system for the drift chambers of a neutrino calorimeter, 8:54679 (R;SU;In Russian)
Estimations of cavity loading by beam for the linac injector for booster and initial consideration for construction of the power input and RF field stabilization systems, 8:54562 (R;SU;In Russian)
Hodoscope shower detector calibration by the π^0(eta^0)$\rightarrow 2\gamma$ decay, 8:54682 (R;SU;In Russian)
Increasing uniformity of light collection in extended scintillation counters by means of spectral shift of scintillator emission, 8:54681 (R;SU;In Russian)
Installation for studying pion radiative scattering on nuclei, 8:54683 (R;SU;In Russian)
Invariant current algebra on the light cone and deep inelastic lepton-hadron scattering. 3. Neutrino reactions, 8:55148 (R;SU;In Russian)
Measurement of the threshold and nominal values of HF fields in the cavities of the linac with HF focusing, 8:54578 (R;SU;In Russian)
Particle dosing for a bubble chamber in the microsecond time range of beam extraction, 8:54684 (R;SU;In Russian)
Slaw extracted proton beam formation and monitoring for the "QUARTZ" setup, 8:54579 (R;SU;In Russian)
Study on transition processes in the stabilization system with HF feedback coupler, 8:54563 (R;SU;In Russian)
Three-dimensional electrostatic field computation for an accelerating structure with spatial-uniform focusing, 8:54577 (R;SU;In Russian)

Great Plains Gasification Associates, Detroit, MI (USA)
Great Plains Gasification Associates. Quarterly technical and environmental report, Great Plains coal gasification project, Mercer County, North Dakota, second quarter, 1983, 8:53336 (R;US)

Gulf Research and Development Co., Pittsburgh, PA (USA)
Kinetics and mechanism of catalytic hydroprocessing of components of coal-derived liquids. Sixteenth quarterly report, February 16, 1983-May 15, 1983, 8:53366 (R;US)

H

Hahn-Meitner-Institut fuer Kernforschung Berlin G.m.b.H. (Germany, F.R.)
Atomic-orbital expansion model for describing ion-atom collisions at intermediate and low energies, 8:55107 (R;US)
Workshop on instrumentation of the disassembled BER II, 8:53983 (R;DE;In German)

Hamburg Univ. (Germany, F.R.). Fachbereich Physik
Magnetic, Moessbauer effect, and neutron small angle scattering measurements on iron clusters in A-zeolites, 8:54214 (R;DE;In German)

Hanford Engineering Development Lab., Richland, WA (USA)
Some design considerations for cask handling at large-scale shipping and receiving facilities, 8:53713 (R;US)
Swelling of high-nickel Fe-Ni-Cr alloys in EBR-II (Contribution to DAFS quarterly), 8:53929 (R;US)
Technique for examining the fuel/cladding interface by TEM, 8:53897 (R;US)

Hannover Univ. (Germany, F.R.). Inst. fuer Technik in Gartenbau und Landwirtschaft
Closing-down greenhouses in times of high energy demand, 8:54166 (R;DE;In German)

Harbridge House, Inc., Washington, DC (USA)
Equivalency methodology: issues, findings, and recommendations, 8:54137 (R;US)

Harry Diamond Labs., Washington, DC (USA)
Physical and computer modeling of military earth grounding practices in a HEMP (high-altitude electromagnetic pulse) environment. Technical memo, 8:54757 (R;US)

Harvard Univ., Cambridge, MA (USA). Div. of Applied Sciences
I-V curves of superconducting microconstrictions. Technical report, 8:55219 (R;US)

Hawaii State Dept. of Planning and Economic Development, Honolulu (USA)
Governor's energy conference - Hawaii's energy options for the 80s, 8:54053 (R;US)

Heidelberg Univ. (Germany, F.R.)
Search for flow in the reaction Ar + Pb, 8:55194 (R;US)

Heliontics, Inc., San Diego, CA (USA). Laser Div.
Semiconductor processing with excimer lasers, 8:53764 (R;US)

Helsinki Univ. of Technology, Espoo (Finland). Dept. of Technical Physics
Feasibility of solar pond heating for northern cold climates, 8:53809 (R;US)
Radiation transmission measurements for solar ponds, 8:53810 (R;US)

Hessisches Ministerium fuer Wirtschaft und Technik, Wiesbaden (Germany, F.R.)
Heat pumps - technology, economy, selection, installation, 8:54167 (R;DE;In German)

Hochtemperatur-Reaktorbau G.m.b.H., Mannheim (Germany, F.R.)
Acoustic system for pipe rupture monitoring and leak detection, 8:53938 (R;XA)
Instrumentation of steam cycle HTR's up to 900 MWe, 8:53885 (R;XA)

Hoffman-Holt, Inc., Silver Spring, MD (USA)
Engineering/economic analysis of coal preparation with flue gas desulfurization for keeping higher sulfur coals in the energy market, 8:53384 (R;US)
Examining relationships between coal characteristics and the performance of TVA power plants. Final report, 8:53861 (R;US)

Humboldt-Universitaet, Berlin (German Democratic Republic). Sektion Physik
Joint annual report 1981, 8:55164 (R;DD;In German)

Hungarian Academy of Sciences, Budapest. Central Research Inst. for Physics
Analog reactivity meter developed from modules of the instrument system for nuclear industry, 8:53941 (R;HU)
Application of function generator for checking reactivity meter accuracy, 8:53942 (R;HU)
Intercomparison of some environmental monitoring methods applied at nuclear power plants in Czechoslovakia (Bohunice) and in Hungary (Paks), 8:54925 (R;HU)

I

Idaho State Univ., Pocatello (USA). Dept. of Biology
Aquaculture report 1976, 8:53839 (R;US)

Idaho Univ., Moscow (USA). Idaho Water and Energy Resources Research Inst.
Aquaculture techniques: a production forecasting model for aquaculture systems. Technical completion report, 8:53779 (R;US)

Illinois Univ., Chicago (USA)
Kinetics of elementary atom and radical reactions. Progress report, 8:55111 (R;US)
Illinois Univ., Chicago (USA). Dept. of Physics
Deep level defects in semiconductors. Final technical report 1 Jul 78-30 Jun 80, 8:54271 (R;US)
Illinois Univ., Urbana (USA)
Velocity-space particle loss in field-reversed theta pinches, 8:55243 (R;US)
Illinois Univ., Urbana (USA). Dept. of Chemical Engineering
Conditions for dropwise condensation on electroplated gold. Final report, February 15, 1980-August 14, 1983, 8:54209 (R;US)
Illinois Univ., Urbana (USA). Dept. of Electrical Engineering
Alkali-rare gas and metal-halide molecules as potential tunable and efficient lasers in the visible. Final report, 1 October 1981-30 September 1982, 8:54499 (R;US)
Illinois Univ., Urbana (USA). Dept. of Forestry
Woody biomass production through solar energy conversion. Annual report, 1980-1981, 8:53773 (R;US)
Illinois Univ., Urbana (USA). Dept. of Physics
FASTBUS diagnostic language. Reference manual for the Unibus process interface, Version 1A(15), 8:55334 (R;US)
FASTBUS Diagnostic Language users manual. Version 3(74), 8:55335 (R;US)
Measurement of high mobilities and strain confinement of long-lived free excitons in Cu20. Interim scientific report, 8:54252 (R;US)
Phonon dispersion of transverse basal-plane modes in alkali-graphite compounds, 8:54253 (R;US)
Illinois Univ., Urbana (USA). Fusion Studies Lab.
Study of $O_3(^1\Delta)$ production by nuclear pumping. Final report submitted to the Air Force Weapons Laboratory, 8:54509 (R;US)
Illinois Univ., Urbana (USA). Nuclear Engineering Lab.
Technical progress report on the TFTR alpha extraction and measurement project, 8:55242 (R;US)
Inhalation Toxicology Research Inst., Albuquerque, NM (USA)
Epidemiology applied to health physics, 8:55003 (R;US)
Institute for Defense Analyses, Arlington, VA (USA). Program Analysis Div.
IDA/BPT crisis relocation planning model: description, documentation and user's guide to the computer program. Final report, 8:55345 (R;US)
Institute of Nuclear Physics, Krakow (Poland)
Fusion of heavy ions in an interaction potential model, 8:55168 (R;PL;In Polish)
Institute of Nuclear Research, Warsaw (Poland)
Program LINEL of calculation of resonant structures for linear accelerators, 8:54580 (R;PL;In Russian)
International Atomic Energy Agency, Vienna (Austria)
Acoustic system for pipe rupture monitoring and leak detection, 8:53938 (R;XA)
AVR-pebble-bed reactor: Core-physics control without incore-instrumentation, 8:53887 (R;XA)
Core-adjacent instrumentation systems for pebble bed reactors for process heat application - state of planning, 8:53886 (R;XA)
Design of reactor protection systems for HTR plants generating electric power and process heat problems and solutions, 8:53888 (R;XA)
Detection of flux perturbations in pebble bed HTGRs by near core instrumentation, 8:53883 (R;XA)
Development of a device to measure coolant flow within CAGR instrumented fuel stringers, 8:53894 (R;XA)
Development of the kits for RIA simultaneous determination of polypeptide hormones. Final report for the period 15 March 1980 - 14 December 1982, 8:54973 (R;XA)
Effects of uranium compounds on skin. Final report for the period 1 July 1980 - 31 October 1982, 8:55043 (R;XA)
Elemental composition of human and animal milk. A review. A report prepared under the auspices of the IAEA in collaboration with the WHO, 8:54983 (R;XA)
Fuel failure detection and location methods in CAGRs, 8:53889 (R;XA)
Fuel temperature measurement in the WAGR, 8:53880 (R;XA)
High temperature measurement by noise thermometry, 8:53881 (R;XA)
In-core flow measurement and calibration of gags using on-load instrumented stringers in a C.A.G.R. at Hinkley Point 'B', 8:53931 (R;XA)
Instrumentation of an HTR and its environmental conditions, 8:53884 (R;XA)
Instrumentation of steam cycle HTR's up to 900 MWe, 8:53885 (R;XA)
Research within the coordinated programme on neutron scattering techniques in applied research. Final report for the period 1 October 1978 - 31 December 1981, 8:55202 (R;XA)
Rice protein improvement through mutation breeding techniques, advance evaluations. Part of a coordinated programme on use of nuclear techniques for cereal grain protein improvement. Final report for the period 1 March 1980 - 31 December 1982, 8:55042 (R;XA)
Task and the technique of temperature instrumentation of HTR's, 8:53878 (R;XA)
Th-230/Th-232 sedimentation rates and the natural radiation background along the western coast of Israel. Final report for the period 15 December 1977 - 31 October 1981, 8:54953 (R;XA)
TWIST: a computer program to calculate errors due to degradation of insulation resistance of mineral insulated thermocouple cables, 8:53930 (R;XA)
Use of chromel-alumel thermocouples in high temperature experiments in WAGR, 8:53879 (R;XA)
Wide range in-core neutron measurement system used in the Windscale AGR concluding experiments, 8:53882 (R;XA)
International Atomic Energy Agency, Vienna (Austria). International Nuclear Data Committee
Evaluation of the (n,2n) and (n,3n) cross-sections for heavy nuclei with allowance for non-equilibrium processes, 8:55199 (R;XA)
Fifth research coordination meeting on the measurement and evaluation of transactinium isotope nuclear data. Central Bureau for Nuclear Measurements, Geel, Belgium, 1-3 September 1982. Summary report, 8:55195 (R;XA)
IAEA advisory group meeting on nuclear structure and decay data, Zeist, The Netherlands, 11-14 May 1982. Summary report, 8:55162 (R;XA)
INDC correspondents for the exchange of nuclear data information, 8:55163 (R;XA)
Minutes of the twelfth INDC meeting, Vienna, 5-9 October 1981, 8:55161 (R;XA)
International Atomic Energy Agency, Vienna (Austria). International Working Group on Gas-Cooled Reactors
Specialists' meeting on gas-cooled reactor core and high temperature instrumentation, Windermere, UK, 15-17 June 1982. Summary report, 8:53890 (R;XA)
International Centre for Theoretical Physics, Trieste (Italy)
Backflow in two and three dimensions, 8:55121 (R;XA)
Binding energy calculations using the molecular orbital wave function, 8:55167 (R;XA)
Interaction between ionization and gravity waves in the upper atmosphere, 8:55101 (R;XA)
Particle transfer in multiregion, 8:55204 (R;XA)
Treatment of Cerenkov radiation from electric and magnetic charges in dispersive and dissipative media, 8:55203 (R;XA)
Internationale Atomreaktorbau G.m.b.H. (INTERATOM), Bergisch Gladbach (Germany, F.R.)
Core-adjacent instrumentation systems for pebble bed reactors for process heat application - state of planning, 8:53886 (R;XA)
Design of reactor protection systems for HTR plants generating electric power and process heat problems and solutions, 8:53888 (R;XA)
Detection of flux perturbations in pebble bed HTGRs by near core instrumentation, 8:53883 (R;XA)
Iowa Dept. of Environmental Quality, Des Moines (USA). Air and Land Quality Div.
Iowa air quality report 1981. Annual report, 8:54882 (R;US)
Iowa State Univ. of Science and Technology, Ames (USA)
Coexistence of long-range magnetic order and superconductivity: an overview of ternary rare-earth compounds, 8:54273 (R;US)
Direct liquid sample introduction into an inductively coupled argon plasma, 8:54293 (R;US)
Iowa State Univ. of Science and Technology, Ames (USA). Dept. of Physics
Piston-displacement equations of state for sodium, potassium, and rubidium metals to 20 kbar from 300 K to 4 K, 8:54275 (R;US)

Iowa State Univ. of Science and Technology, Ames (USA). Energy and Mineral Resources Research Inst.
Facile reaction/extraction of coal with supercritical fluids. Quarterly technical progress report, April 1, 1983-June 30, 1983, 8:53344 (R;US)
Iowa Univ., Iowa City (USA). Dept. of Physics and Astronomy
Absorption of energetic protons by Saturn's ring g. Progress report for FY83, 8:55085 (R;US)
Chorus-related electrostatic bursts at Jupiter and Saturn. Progress report, 8:55091 (R;US)
Electron acceleration by Landau resonance with whistler mode wave packets. Progress report, 8:55098 (R;US)
Ion cyclotron waves in the Io plasma torus: polarization reversal of whistler mode noise. Revision. Progess report, 8:55090 (R;US)

J

Japan Atomic Energy Research Inst., Tokai, Ibaraki
Parametric study of LH current drive for FED-A, 8:55237 (R;US)
Jet Propulsion Lab., Pasadena, CA (USA)
Semiconductor processing with excimer lasers, 8:53764 (R;US)
Total-dose radiation-effects data for semiconductor devices. Vol. 1, 8:54759 (R;US)
Total-dose radiation-effects data for semiconductor devices. Vol. 2, 8:54760 (R;US)
Johns Hopkins Univ., Baltimore, MD (USA)
Animal-sediment relationships: a case study of the Patapsco River, 8:54955 (R;US)
Fuel ignition by high voltage capacitive discharges, 8:53863 (R;US)
Johns Hopkins Univ., Laurel, MD (USA). Applied Physics Lab.
Coal combustion waste leachate scaling. Final report, July 1981-June 1982, 8:53388 (R;US)
Joint Inst. for Nuclear Research, Dubna (USSR)
Spectrometer for studying spontaneous radiation emitted during high-energy electron and positron channeling in monocrystals, 8:54704 (R;SU;In Russian)
Joint Inst. for Nuclear Research, Dubna (USSR). Dept. of New Acceleration Methods
Experimental determination of the nuclear reaction yield uses for beam diagnostics of the KUTI prototype, 8:54583 (R;SU;In Russian)
Plastic scintillation monitor for methodical investigation of track detectors on the JINR synchrophasotron, 8:54585 (R;SU;In Russian)
Joint Inst. for Nuclear Research, Dubna (USSR). Dept. of Radiation Safety
Application of the plastic scintillator counter for measuring the high-energy neutron spectra, 8:54700 (R;SU;In Russian)
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation
Assembly and copying of the results of multiview events from the RISK chamber measured on AELT-2/160 device, 8:54703 (R;SU;In Russian)
Cubic approximation and local limitations to functional arbitraries in the general solution of Chew-Low equations, 8:55225 (R;SU;In Russian)
One problem of the busy period determination in queues with infinitely many servers, 8:54701 (R;SU)
Sturm solutions of two-center problem in quantum mechanics, 8:55226 (R;SU;In Russian)
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy
Analysis of hadron jet behaviour in πpC interactions at 40 GeV/c, 8:55173 (R;SU;In Russian)
Characteristics of secondary neutrons in the π^-p, π^-n, π^-^{12}C interactions at P=40 GeV/c, 8:55174 (R;SU;In Russian)
Correlation effects in multiple particle production on nuclei in the cumulative region, 8:55169 (R;SU)
Dubna synchrophasotron. Operation and improvement (quarter 4, 1981), 8:54611 (R;SU;In Russian)
Dubna synchrophasotron. Operation and improvement (quarter 1, 1982), 8:54612 (R;SU;In Russian)
Hyperon production in nC interactions in the neutron beam with approximately 40 GeV/c momentum, 8:55139 (R;SU;In Russian)
Inelastic scattering of 8.9 GeV/c deuterons on carbon, 8:55171 (R;SU)
Neutral pion production in pion-xenon nucleus collisions at 3.5 GeV/c momentum, 8:55185 (R;SU)
Orbit correction in a heavy-ion synchrotron, 8:54586 (R;SU;In Russian)
Orbit correction in synchrotrons. Review, 8:54587 (R;SU;In Russian)
Residual magnetic field in the magnet of the Dubna synchrophasotron and its compensation, 8:54584 (R;SU;In Russian)
Study of the incident pion deflection in passing through atomic nucleus, 8:55184 (R;SU)
Study of the particle production process using nuclear targets. Pt. 3 Effects testable in hadron-nucleon experiments, nature of intermediate objects, conclusion, 8:55149 (R;SU)
Study of the proton momentum spectrum from deuteron fragmentation at 8.9 GeV/c and an estimate of admixture parameters for the six-quark state in deuteron, 8:55170 (R;SU)
Three prototype units of a superconducting magnet system, 8:54613 (R;SU;In Russian)
Two loop circuit of pulse charoge of forming lines for streamer chamber supply, 8:54699 (R;SU;In Russian)
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics
Differential neutron scattering cross sections and average neutron parameters of tin isotopes, 8:55187 (R;SU;In Russian)
Method of summation of amplitudes of coinciding pulses from Ge(Li) detectors used to study cascades of gamma-transitions in (n,γ) reaction, 8:54705 (R;SU;In Russian)
Multicomputer measurement centre of the Laboratory of nuclear physics - a prototype of computer network for automation of scientific research, 8:54693 (R;SU;In Russian)
Parity nonconservation in neutron resonances, 8:55180 (R;SU;In Russian)
Search for radiative capture of neutrons in nuclei stimulated by the electric field of a laser wave, 8:55186 (R;SU;In Russian)
Study on the ^{23}Na(n,p)^{23}Ne reaction at the neutron energy up to 1000 eV, 8:55178 (R;SU;In Russian)
System for correlational and spectral measurements of IBR-2 reactor parameters, 8:53940 (R;SU;In Russian)
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems
Data compression methods in problems of experimental nuclear physics, 8:55115 (R;SU;In Russian)
Detection of inverse electroproduction of pions on ^{7}Li nuclei, 8:55172 (R;SU;In Russian)
Event selection in the experiments on studying μ-atomic and mesic molecular processes, 8:54696 (R;SU;In Russian)
Generalized formulas for determining kinematic parameters of charged particle tracks with the account of total error matrix in factorized representation, 8:54694 (R;SU;In Russian)
Index algorithm for forming approximation function in the least square method, 8:55336 (R;SU;In Russian)
Investigation of large cylindrical scintillation spectrometer section, 8:54698 (R;SU;In Russian)
Organization of the RISK spectrometer electronic logic circuits on the base of the event preliminary selection unit, 8:54697 (R;SU;In Russian)
Position-sensitive semiconductor detectors of nuclear radiations, 8:54695 (R;SU;In Russian)
Reversal film development for streamer chamber track photographs, 8:54702 (R;SU)
Study on the pion absorption by atomic nuclei by means of multilayer semiconductor spectrometer, 8:55188 (R;SU;In Russian)
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions
Effect of high-energy ion irradiation on aluminium creep, 8:54217 (R;SU;In Russian)
"Lidia" ultrasensitive mass spectrometer, 8:54761 (R;SU)
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics
Diagram summation method in Schwinger source theory, 8:55159 (R;SU)
Phase transitions in the euclidean and hamiltonian approaches in the lattice gauge theories at finite temperature, 8:55158 (R;SU)

Quantum-mechanical oscillator with an arbitrary anharmonicity 1/N expansion and perturbation theory, 8:55224 (R;SU)
Relativistic string theory and nonlinear two-dimensional sigma-model, 8:55150 (R;SU)
JRB Associates, Inc., McLean, VA (USA)
Projects GNOME and SEDAN, the PLOWSHARE program. Technical report 1961-1973, 8:54871 (R;US)

K

Kansas State Univ., Manhattan (USA)
Atomic-orbital expansion model for describing ion-atom collisions at intermediate and low energies, 8:55107 (R;US)
Karl-Marx-Universitaet, Leipzig (German Democratic Republic). Sektion Physik
Joint annual report 1981, 8:55164 (R;DD;In German)
Kellogg (M.W.) Co., Houston, TX (USA)
Engineering-support services for the DOE/GRI coal-gasification research program. Monthly technical progress report, 27 February-26 March 1982, 8:53335 (R;US)
Kentucky Geological Survey, Lexington (USA)
National tar sands (heavy oil) symposium, 8:53448 (R;US)
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Festkoerperforschung
Spectroscopic investigations of the physical state of helium in small bubbles in aluminium and nickel films, 8:54218 (R;DE;In German)
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorentwicklung
Acoustic system for pipe rupture monitoring and leak detection, 8:53938 (R;XA)
Core-adjacent instrumentation systems for pebble bed reactors for process heat application - state of planning, 8:53886 (R;XA)
Detection of flux perturbations in pebble bed HTGRs by near core instrumentation, 8:53883 (R;XA)
Investigation of a high-temperature reactor with a central region of graphite-spheres, 8:53918 (R;DE;In German)
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Zentralabteilung fuer Chemische Analyse
Background radioactivity in the monazite areas of Kerala, India, 8:54924 (R;DE)
Kerntechnischer Ausschuss (KTA), Koeln (Germany, F.R.)
Safety engineering: KTA Code of Practice. Lifting mechanisms in nuclear plant, 8:53933 (TG;GB)
Kling-Lindquist, Inc., Philadelphia, PA (USA)
Energy monitoring and control systems inspection guidelines. Final report, 8:54124 (R;US)
KMS Fusion, Inc., Ann Arbor, MI (USA)
Review of two-stage FEL research at KMS fusion. Technical report Jan-Sep 82, 8:54500 (R;US)
Kyoto Univ., Kumatori, Osaka (Japan). Research Reactor Inst.
Analysis of the KUCA MEU experiments using the ANL code system, 8:53964 (R;US)
Experimental studies on the production of ultra cold neutrons by using an accelerator neutron source, 8:53732 (R;JP;In Japanese)
Neutronics and thermal-hydraulics analysis of KUHFR, 8:53961 (R;US)

L

Laboratoire Leon Brillouin, Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)
Annual progress report 1981-1982, 8:54268 (R;FR;In French)
Lantz America, New York
Evaluation and test program of a 50-ton-per-day Lantz converter. Second quarterly technical progress report, 8:54182 (R;US)
Evaluation and test program of a 50-ton-per-day Lantz converter. Third quarterly technical progress report, 8:54183 (R;US)
Law Engineering Testing Co., Atlanta, GA (USA)
Petrographic and geochemical characteristics of the Cypress Creek salt core, 8:53663 (R;US)
Lawrence Berkeley Lab., CA (USA)
344 cm x 86 cm low mass vacuum window, 8:54620 (R;US)
Characteristic time structure in slow resonant extracted beam, 8:54621 (R;US)
Collider detectors: present capabilities and future possibilities, 8:54706 (R;US)
Convective heat transfer in buildings: recent research results. Rev., 8:54139 (R;US)
Effect of lithium carbonate on the reaction of CaO powders with CO_2, 8:54308 (R;US)
Fast, self-nulling spectroscopic ellipsometer: instrumentation and application. Revision, 8:54765 (R;US)
Forced two-phase cooling of the TPC superconducting solenoid, 8:54477 (R;US)
Geochemical assessment of nuclear waste isolation. Report of activities during fiscal year 1982, 8:53649 (R;US)
Heat transfer to subcooled He I, 8:54522 (R;US)
Identification and separation of the organic compounds in coal-gasification condensate waters, 8:53371 (R;US)
Influence of alloy composition on the cryogenic mechanical properties of AISI 200 grade high-manganese austenitic steels, 8:54219 (R;US)
Influence of heat-treatment and physicochemical properties on the electrochemical oxidation of carbon blacks in phosphoric acid, 8:54049 (R;US)
Low-noise gallium-arsenide field-effect transistor preamplifiers for stochastic beam-cooling systems, 8:54619 (R;US)
Metabolic changes associated with shoot formation in tobacco callus cultures, 8:54968 (R;US)
Phase equilibria for complex fluid mixtures, 8:53372 (R;US)
Proceedings of the seventh international conference on high voltage electron microscopy, 8:54766 (R;US)
Quark-gluon plasma formation, 8:55152 (R;US)
Role of microstructural inhomogeneities on high-temperature failure in ceramics, 8:54257 (R;US)
Search for flow in the reaction Ar + Pb, 8:55194 (R;US)
Specific heat of ^{3}He in the Fermi-liquid region, 8:54764 (R;US)
Variable-emittance filter for the Electron Laser Facility, 8:54594 (R;US)
Lawrence Livermore National Lab., CA (USA)
Advanced high-field coil designs: 20 TESLA, 8:55310 (R;US)
Air-breakdown limits for microwave-pulse propagation. Part I. Experiments, 8:54553 (R;US)
Creation of ultra-high-pressure shocks by the collision of laser-accelerated disks: experiment and theory, 8:55315 (R;US)
Deposition of cesium iodide on parylene, 8:54771 (R;US)
Design and construction of a large, vertical-axis diamond turning machine, 8:54478 (R;US)
Design and construction of the vacuum vessel for the tandem Mirror Fusion Test Facility, 8:55312 (R;US)
Disposal of activated fusion wall materials, 8:53727 (R;US)
Evacuation emergency response model coupling atmospheric release advisory capability output, 8:54037 (R;US)
FACET: a radiation view factor computer code for axisymmetric, 2D planar, and 3D geometries with shadowing, 8:54525 (R;US)
FET full-bridge switcher for inductorless capacitor charging for Nova, 8:54554 (R;US)
General ignition requirements in TMR's with drift pumping, 8:55248 (R;US)
Inverse Born Approximation: exact determination of shape of convex voids, 8:54532 (R;US)
Ion microstability in tandem mirrors, 8:55250 (R;US)
Irradiations at the Rotating Target Neutron Source-II. 1982 annual report: Joint US-Japan Sponsorship, 8:55307 (R;US)
Kinds and quantities of organic combustion products in solid and liquid wastes from a coal-fired power station, 8:53393 (R;US)
Lithium equation-of-state, 8:54240 (R;US)
Low-jitter, hydrogen thyratron Pockels cell driver, 8:55309 (R;US)
MFR total ozone grid point data, 8:54877 (R;US)
Numerical solution to the Stokes equations for flow past two spheres and a chain of particles attached to a sphere, with an application to filter clogging, 8:55122 (R;US)
Physics considerations for tandem-mirror magnet design, 8:55314 (R;US)
Precision support of annular optics, 8:54479 (R;US)
Progress on ultrasonic flaw sizing in turbine-engine rotor components: bore and web geometries, 8:54534 (R;US)
Scientific program and abstracts, 8:54604 (R;US)
Secret high-temperature reactor concept for inertial fusion, 8:55308 (R;US)

Seismic Safety Margins Research Programs. Assessment of potential increases in risk due to degradation of steam generator and reactor coolant pump supports, 8:54032 (R;US)
Spallation and 14-MeV neutron irradiation of stabilized NbTi superconductors, 8:55282 (R;US)
Status of tandem-mirror confinement, 8:55251 (R;US)
Summary of the MARS tandem-mirror reactor design, 8:55313 (R;US)
Technical-evaluation report on the monitoring of electric power to the reactor-protection system for the Peach Bottom Atomic Power Station Units 2 and 3 (Docket Nos. 50-277, 50-278, 8:53909 (R;US)
Thermal barriers: their purpose and functioning, 8:55316 (R;US)
Three-dimensional equilibrium in quadrupole symmetric tandem mirrors in the paraxial limit (reduced MHD), 8:55249 (R;US)
Time-series models with many discrete alternatives, 8:55342 (R;US)
TMX-U experimental results, 8:55247 (R;US)
Vacuum measurements on the Tandem Mirror Experiment Upgrade (TMX-U) fusion experiment, 8:55311 (R;US)
Variable-emittance filter for the Electron Laser Facility, 8:54594 (R;US)

Long Beach, City of, CA (USA)
Improved secondary oil recovery by controlled waterflooding-pilot demonstration: Ranger Zone, Fault Block VII, Wilmington Field. Phase IV. Quarterly report, April-June 1983, 8:53433 (R;US)

Los Alamos National Lab., NM (USA)
Calculation of nuclear properties far from the line of β stability, 8:55189 (R;US)
Epidemiology applied to health physics, 8:55003 (R;US)
Equations governing the liquid-film flow over a plane with heat flux and interfacial phase change, 8:54529 (TG;US)
Evolution of long pulses in a tapered wiggler free-electron laser, 8:54510 (R;US)
Experiment to determine properties of packed particle beds and regenerators at cryogenic temperatures, 8:54475 (R;US)
High-speed videography combined with an x-ray image intensifier for dynamic radiography, 8:54538 (R;US)
Linked-state machines, 8:55338 (R;US)
Los Alamos free-electron-laser oscillator experiment: plans and present status, 8:54511 (R;US)
Microprobe analyses of rare-earth-element fractionation in meteoritic minerals, 8:55094 (R;US)
Nuclear physics problems for accreting neutron stars, 8:55095 (R;US)
Selective laser ionization for mass-spectral isotopic analysis, 8:55116 (R;US)
Survey of flash x-ray techniques and applications, 8:54539 (R;US)
VISAR: some things you should know, 8:54763 (R;US)

Los Angeles, City of, CA (USA)
Volunteers for Energy Conservation. Final report, 8:54193 (R;US)

Louisiana State Univ., Baton Rouge (USA)
Feasibility of development of a nuclear density gage for determining the density of plastic concrete at a particular stratum. Final report July 77-May 81, 8:54732 (R;US)

Louisiana State Univ., Baton Rouge (USA). Inst. for Environmental Studies
Topical reports on Louisiana salt domes, 8:53664 (R;US)

Lund Univ. (Sweden)
Calculation of nuclear properties far from the line of β stability, 8:55189 (R;US)

LuTech, Inc., Berkeley, CA (USA)
Analysis of novel superconducting magnetometer with superior noise and coupling properties. Interim report, 8:54372 (R;US)

M

Maine Univ., Orono (USA). Land and Water Resources Inst.
Removal of radon from water using granular activated carbon adsorption. Annual report, 8:54300 (R;US)

Massachusetts Inst. of Tech., Cambridge (USA)
Zone-melting recrystallization for solar cells. Annual progress report, September 1, 1982-August 31, 1983, 8:53771 (R;US)

Massachusetts Inst. of Tech., Cambridge (USA). Energy Lab.
Cogeneration and utility planning. Final report, 8:54187 (R;US)

Massachusetts Inst. of Tech., Cambridge (USA). Research Lab. of Electronics
Non-linear optical interactions in semiconductors. Final report 1 Apr 79-31 Mar 83, 8:54507 (R;US)

Massachusetts Inst. of Tech., Cambridge (USA). Sea Grant Coll. Program
Oil spill incidence simulation model: description and user's manual, 8:53442 (R;US)

Massachusetts Inst. of Tech., Lexington (USA). Lincoln Lab.
Development and evaluation of solar-photovoltaic systems. Final report, 8:53790 (R;US)

Maurer Engineering, Inc., Houston, TX (USA)
Development of turbodrill tachometer. Final report, 8:53430 (R;US)

McDonnell Douglas Astronautics Co., Huntington Beach, CA (USA)
Electric fields in earth orbital space. Annual report, 8:55089 (R;US)

McGill Univ., Montreal, Quebec (Canada). Dept. of Mechanical Engineering
Detonation of hydrogen-air mixtures, 8:54036 (R;US)

McNamee, Porter and Seeley, Ann Arbor, MI (USA)
Inhibition of nitrification by chromium in a biodisc system, 8:55068 (R;US)

Mead Technology Labs., Research Triangle Park, NC (USA)
Ohio River Valley Study. Sites, methods, data summary for 1980. Volume 1. Main report. Report, October 1979-December 1980, 8:54901 (R;US)
Ohio River Valley Study. Sites, methods, data summary for 1980. Volume 2. Appendices. Report for Oct 79-Dec 80, 8:54902 (R;US)

Meridian Corp., Falls Church, VA (USA)
DOE renewable energy program. Final report, 8:54110 (R;US)

Michigan State Univ., East Lansing (USA). Dept. of Agricultural Engineering
Technical and economic feasibility of utilizing apple pomace as a boiler feedstock, 8:53746 (R;US)

Michigan Technological Univ., Houghton (USA). Dept. of Forestry
Application of sugar maple and black locust to the biomass/energy-plantation concept. Annual report, March 1, 1981-February 28, 1982, 8:53772 (R;US)

Michigan Univ., Ann Arbor (USA). Dept. of Mechanical Engineering
Effect of volatility on air-fuel ratio distribution and torque output of a carbureted light aircraft piston engine. Final report, May 1981-September 1982, 8:54197 (R;US)

Midwest Research Inst., Kansas City, MO (USA)
Evaluation of the use of multicomponent refrigerants in gas-fired heat pumps. Final report Jan 82-Feb 83, 8:54142 (R;US)

Minerals Management Service, Anchorage, AK (USA). Alaska Outer Continental Shelf Region
Diapir Field lease offering, June 1984, 8:53440 (R;US)

Mine Safety and Health Administration, Arlington, VA (USA)
Annual report of the Secretary of Labor under the Federal Mine Safety and Health Act of 1977, fiscal year 1979. Volume 1, 8:53402 (R;US)
Annual report of the Secretary of Labor under the Federal Mine Safety and Health Act of 1977, fiscal year 1980. Volume 1, 8:53405 (R;US)

Mine Safety and Health Administration, Denver, CO (USA). Health and Safety Analysis Center
Injury experience in metallic mineral mining, 1979, 8:55075 (R;US)
Injury experience in metallic mineral mining, 1981, 8:55078 (R;US)
Injury experience in sand and gravel mining, 1981, 8:55077 (R;US)
Use of aircraft imagery in evaluating ground stability at open-pit uranium mines in Gas Hills, Wyoming, 8:53468 (R;US)

Mine Safety and Health Administration, Pittsburgh, PA (USA). Pittsburgh Technical Support Center
Laboratory evaluation of RACAL airstream helmet, 8:55076 (R;US)

Mining Enforcement and Safety Administration, Denver, CO (USA). Health and Safety Analysis Center
Analysis of accidents related to falls of ground in metal and nonmetal mines, 1972-73, 8:55074 (R;US)

Mining Enforcement and Safety Administration, Pittsburgh, PA (USA). Pittsburgh Technical Support Center
Testing procedure for the certification of underground protective cabs and canopies, 8:53426 (R;US)

Mining Enforcement and Safety Administration, Washington, DC (USA)
Annual report and achievements 1976, 8:53407 (R;US)
Annual report and achievements 1977, 8:53409 (R;US)
Minnesota Univ., Minneapolis (USA)
Two-dimensional analysis of joint and fault plane stability around a radioactive waste repository in bedded salt, 8:53659 (R;US)
Minnesota Univ., St. Paul (USA). Water Resources Research Center
Hydrocarbon spills, their retention in the subsurface and propagation into shallow aquifers, 8:54943 (R;US)
Mission Research Corp., Albuquerque, NM (USA)
Beam breakup instabilities in high current electron beam racetrack induction accelerators, 8:54573 (R;US)
Extraction and propagation of an intense rotating electron beam, 8:54570 (R;US)
High current betatron stability and injection studies, 8:54572 (R;US)
Thermonuclear burn in cylindrical targets. Final report, 8:55255 (R;US)
Mission Research Corp., Santa Barbara, CA (USA)
Evaluation of AURORA as a tactical source region simulation. Contractor report, 8:54754 (R;US)
Techniques for source-region EMP experiments at AURORA. Contractor report, 8:54756 (R;US)
Mississippi-Alabama Sea Grant Consortium, Ocean Springs, MS (USA)
Potential damage of oil wastes in coastal estuary sediments, 8:53441 (R;US)
Mississippi State Univ., Mississippi State (USA). MHD Energy Center
Differential optical absorption techniques for diagnostics of coal gasification. Technical progress report, April-June 1983, 8:53368 (R;US)
Missouri Univ., Columbia (USA). Dept. of Chemistry
Laboratory test procedure to determine the mobilization of trace elements and other pollutants during in-situ coal gasification, 8:53351 (R;US)
Mitre Corp., McLean, VA (USA). METREK Div.
Repowering with solar energy, 8:53791 (R;US)
Mitsubishi Heavy Industries Ltd., Tokyo (Japan)
Improvement of ISI techniques by multi-frequency eddy current testing method for steam generator tube in PWR plant, 8:53875 (R;JP)
Studies on analytical method and nondestructive measuring method on the sensitization of austenitic stainless steels, 8:54540 (R;JP)
Technical review, volume 19, number 3, serial number 55, October 1982 (Mitsubishi Heavy Industries), 8:54168 (R;US)
Ultrasonic testing of austenitic stainless steel welds, 8:54541 (R;JP)
Monsanto Research Corp., Miamisburg, OH (USA). Mound
Cyclone incinerator: operating experience, 8:53651 (R;US)
Evaluation of a processing technique for immobilization of low-level waste, 8:53650 (R;US)
Interface formation in physically deposited films, 8:54236 (R;US)
Mueller Associates, Inc., Baltimore, MD (USA)
Brewing industry potential for the immediate and near-term production of fuel-grade ethyl alcohol. Final report, 8:53743 (R;US)

N

Nagoya Univ. (Japan). Inst. of Plasma Physics
Measurement of environmental radioactivity in Toki district, 8:54690 (R;JP;In Japanese)
National Academy of Sciences - National Research Council, Washington, DC (USA)
Domestic potential of solar and other renewable energy sources. Supporting paper 6, 8:53760 (R;US)
National Academy of Sciences, Washington, DC (USA). Assembly of Mathematical and Physical Sciences
Evaluative report on the Institute for Materials Research, National Bureau of Standards - fiscal year 1976. Annual report, 8:54202 (R;US)
Evaluative report on the Institute for Materials Research, National Bureau of Standards - fiscal year 1977. Annual report, 8:54203 (R;US)
National Aeronautics and Space Administration, Cleveland, OH (USA). Lewis Research Center
Analytical model for predicting emergency shutdown of a two-bladed horizontal-axis turbine, 8:53848 (R;US)
Mathematical model for the doubly fed wound-rotor generator, 8:53847 (R;US)
National Building Research Inst., Pretoria (South Africa)
Integral solar water heaters in low income housing: a preliminary report on a research and development project, 8:53802 (R;US)
National Bureau of Standards, Washington, DC (USA)
Application of photothermal techniques for trace detection of NO_2 in the troposphere, 8:54878 (R;US)
Experimental verification of the neutron spectrum from the NBS D_2O-moderated ^{252}Cf source, 8:55212 (R;US)
NBS reactor: summary of activities July 1981 through June 1982. Technical note. Jul 81-Jun 82, 8:53968 (R;US)
Perspectives in high energy nuclear collisions, 8:55190 (R;US)
National Bureau of Standards, Washington, DC (USA). Radiation Physics Div.
Photodisintegration of the deuteron, 1982, 8:55166 (R;US)
National Center for Appropriate Technology, Butte, MT (USA)
Drying wood with the sun: how to build a solar-heated firewood dryer, 8:53801 (R;US)
National Coal Board, Leatherhead (UK). Coal Utilization Research Lab.
20-atmosphere rig PFBC test results: Tests 10 and 12. Investigations into the use of limestone as a sorbent, 8:54560 (R;US)
National Inst. for Occupational Safety and Health, Cincinnati, OH (USA)
Image analysis of chest radiographs. Final report, 8:54976 (R;US)
National Inst. for Occupational Safety and Health, Morgantown, WV (USA)
Appalachian coal miner mortality study: a 14-year follow-up, 8:53427 (R;US)
Effects of added resistance to breathing in obstructed lung disease. Phase 1, 8:54975 (R;US)
National Inst. of Radiological Sciences, Chiba (Japan)
Annual report of National Institute of Radiological Sciences of the fiscal year 1978, 8:55324 (R;JP;In Japanese)
Annual report of National Institute of Radiological Sciences of the fiscal year 1979, 8:55325 (R;JP;In Japanese)
Radioactivity survey data in Japan, 8:54898 (R;JP)
National Lab. for High Energy Physics, Oho, Ibaraki (Japan)
Alternative longitudinal polarization scheme for tristan, 8:54643 (R;JP)
Beryllium window for synchrotron radiation, 8:54617 (R;JP;In Japanese)
BSF beam line, 8:54588 (R;JP)
Calculation on longitudinal instability due to RF cavities, 8:54618 (R;JP)
Closed orbit correction in accumulation ring of TRISTAN, 8:54589 (R;JP)
Computer simulation of the heating effect on mirrors by synchrotron radiation, 8:54644 (R;JP)
Improvement of radiative polarization in plane storage rings, 8:54591 (R;JP)
Neutrino-oscillation experiments at Brookhaven National Laboratory, 8:55127 (R;US)
Note on depolarizing resonances in the KEK 12 GeV synchrotron, 8:54590 (R;JP)
Study on low energy intense kaon beam, 8:54616 (R;JP)
Superconducting magnet activities at CEN Saclay. A brief summary, 8:54474 (R;JP)
National Library of Medicine, Washington, DC (USA)
Problems involved in the computer identification of replicate entries in TOXLINE, 8:55330 (R;US)
National Oceanic and Atmospheric Administration, Boulder, CO (USA). Space Environment Lab.
Studies of solar Ca K plages and UV, X-ray and 10 cm variations. Technical memo, 8:55096 (R;US)
National Oceanic and Atmospheric Administration, Washington, DC (USA). Office of Ocean Minerals and Energy
Permits and regulations applicable to United States ocean thermal energy conversion projects, 8:53798 (R;US)
National Physical Lab., Teddington (UK). Div. of Electrical Science
Large aperture calorimeter for fusion laser measurements, 8:55295 (R;US)

National Research Council, Washington, DC (USA). Committee on Nuclear and Alternative Energy Systems
Alternative energy demand futures to 2010, 8:54081 (R;US)
U.S. energy supply prospects to 2010, 8:54082 (R;US)
Nauchno-Issledovatel'skij Inst. Atomnykh Reaktorov, Dimitrovgrad (USSR)
Analysis of americium and curium resonance parameters, 8:55196 (R;SU;In Russian)
Mathematical model for long-term and current planning of materials research and development with restrictions on the experimental equipment lifetime, 8:54542 (R;SU;In Russian)
Software for the PROFILE subsystem in the radiation material testing research system for mass measurements of irradiated fuel element geometric dimensions, 8:53967 (R;SU;In Russian)
Nauchno-Issledovatel'skij Inst. Ehlektrofizicheskoj Apparatury, Leningrad (USSR)
To the choice of a konfiguration of electromagnet magnetic circuit elements, 8:54622 (R;SU;In Russian)
Naval Civil Engineering Lab., Port Hueneme, CA (USA)
Control strategies for reducing heating, ventilating, and air conditioning (HVAC) energy consumption in single buildings. Final report Jan-Jun 82, 8:54127 (R;US)
Parametric examination of the heat recovery incinerators at NAS (Naval Air Station), Jacksonville. Report for Oct 81-Sep 82, 8:54157 (R;US)
Sulfur oxides control burner. Final report Oct 79-Sep 81, 8:53420 (R;US)
Naval Ocean Research and Development Activity, NSTL, MS (USA)
Piezometer-probe technology for geotechnical investigations in coastal and deep-ocean environments, 8:54769 (R;US)
Naval Postgraduate School, Monterey, CA (USA)
Cerenkov radiation. Master's thesis, 8:55201 (R;US)
Naval Research Lab., Washington, DC (USA)
Beam-target interaction of intense ion beams: theory and experiment, 8:55304 (R;US)
Charge-charge correlation functions in ultra dense plasmas. Memorandum report, 8:55235 (R;US)
Creation of ultra-high-pressure shocks by the collision of laser-accelerated disks: experiment and theory, 8:55315 (R;US)
Decoupling ion efficiency from impedance in pulsed-power diodes, 8:55294 (R;US)
Dielectronic recombination rates, ionization equilibrium, and radiative emission rates for MN ions in low-density high-temperature plasmas. Memorandum report, 8:55103 (R;US)
Drag instability in the modified betatron. Memorandum report, 8:54571 (R;US)
Experimental methods for studying the Rayleigh-Taylor instability of ablatively accelerated targets. Memorandum report, 8:55257 (R;US)
Laser-plasma interaction experiments and diagnostics at NRL (Naval Research Laboratory). Memorandum report, 8:55254 (R;US)
Mode coupling in the modified betatron. Memorandum report, 8:54568 (R;US)
Numerical simulation of the axisymmetric hollowing instability. Memorandum report, 8:54569 (R;US)
Parameter survey for collisionless coupling in a laser simulation of hane (high altitude nuclear explosion). Memorandum report, 8:54870 (R;US)
Prospects for optical probing of the Rayleigh-Taylor instability in ablatively-accelerated foil targets. Progress report, 8:55256 (R;US)
Stabilizing effect of gas conductivity evolution on the resistive sausage mode of a propagating beam. Memorandum report, 8:55234 (R;US)
Stimulated Brillouin backscatter in long scale length plasmas. Memorandum report, 8:55258 (R;US)
Naval Research Lab., Washington, DC (USA). E.O. Hulburt Center for Space Research
Quantitative study of magnetic flux transport on the sun, 8:55088 (R;US)
Naval Ship Research and Development Center, Annapolis, MD (USA)
Computer program for performance and sizing analysis of compact counter-flow plate-fin heat exchangers. Research and development report, 8:54517 (R;US)
Naval Surface Weapons Center, Dahlgren, VA (USA)
Detonation. Proceedings, 8:54785 (R;US)
Nebraska Univ., Lincoln (USA). Dept. of Mathematics
Effects of dissipation in one-dimensional inverse problems, 8:55223 (R;US)
New Mexico Health and Environment Dept., Santa Fe (USA). Environmental Improvement Div.
Potential problems from shipment of high-curie content contact-handled transuranic (CH-TRU) waste to WIPP, 8:53580 (R;US)
New Mexico State Univ., Las Cruces (USA)
Transient response of circular-foil heat-flux gages, 8:54768 (R;US)
New Mexico State Univ., Las Cruces (USA). New Mexico Energy Inst.
Leasing of federal surface lands for direct-use geothermal-energy developments, 8:53840 (R;US)
New York Univ., NY (USA). Magneto-Fluid Dynamics Div.
Fast reconnection of magnetic fields in a plasma, 8:55287 (R;US)
North Carolina Coastal Energy Impact Program, Raleigh (USA)
Analysis of the impact of coal trains moving through Morehead City, North Carolina, 8:53398 (R;US)
Area development plan for Radio Island, 8:54060 (R;US)
Beach communities and oil spills: environmental and economic consequences for Brunswick County, North Carolina. Summary report, 8:54957 (R;US)
Coal train movements through the city of Wilmington, North Carolina, 8:53397 (R;US)
Review and evaluation of oil spill models for application to North Carolina waters. Final report, 8:54944 (R;US)
North Carolina Dept. of Commerce, Raleigh (USA). Energy Div.
North Carolina Energy Institute. Annual report, 1982, 8:54070 (R;US)
North Dakota State Univ., Fargo (USA). Dept. of Chemistry
Application of Kelgraph to electrochemical detectors for flow injection analysis and high performance liquid chromatography. Technical report, 8:54299 (R;US)
Northern Indiana Public Service Co., Hammond (USA)
Summary report: laser candidates for inertial fusion, 8:55288 (R;US)
North Shore Ecology Center, Glencoe, IL (USA)
How to run a community recycling center: a resource guide to low-technology recycling in Illinois, 8:54188 (R;US)
Northwestern Univ., Evanston, IL (USA). Dept. of Chemical Engineering
Solid-state, surface, and catalytic properties of oxides. Progress report, October 1, 1982-August 31, 1983, 8:54306 (R;US)
Northwestern Univ., Evanston, IL (USA). Dept. of Physics and Astronomy
Electronically induced phase transformations. Annual report 1 Oct 81-30 Sep 82, 8:54270 (R;US)
Search for right-handed currents in muon decay, 8:55134 (R;US)
Nuclear Regulatory Commission, Arlington, TX (USA). Region IV
Final environmental statement related to the operation of the Teton Uranium ISL Project (Docket No. 40-8781, 8:54961 (R;US)
Nuclear Regulatory Commission, Washington, DC (USA). Div. of Technical Information and Document Control
Title list of documents made publicly available, June 1-30, 1983. Volume 5 No. 6, 8:53907 (R;US)
Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Reactor Regulation
Draft environmental statement related to steam generator repair at H.B. Robinson Steam Electric Plant Unit No. 2, (Docket No. 50-261), 8:53876 (R;US)
Integrated plant safety assessment. Systematic Evaluation Program. La Crosse Boiling Water Reactor. Dairyland Power Cooperative, Docket No. 50-409. Final report, 8:54026 (R;US)
Safety-evaluation report related to the operation of Shoreham Nuclear Power Station, Unit No. 1 (Docket No. 50-322) , 8:54025 (R;US)
Nuclear Regulatory Commission, Washington, DC (USA). Office of Resource Management
Regulatory licensing status summary report. Volume 12, No. 8. Nuclear power plants data for decisions (blue book), August 1-August 31, 1983, 8:53908 (R;US)
NUS Corp., Rockville, MD (USA)
Environmental characterization of bedded salt formations and overlying areas of the Permian Basin, 8:53689 (R;US)

O

Oak Ridge National Lab., TN (USA)
a-c losses of 19-strand subcables for the ANL 3.3-MJ coil, 8:54471 (R;US)
Accident at Three Mile Island and its aftermath, 8:54021 (R;US)
Annotated bibliography covering generation and use of evaluated cross section uncertainty files, 8:55160 (R;US)
Antennas and waveguides for electron-cyclotron heating of plasmas, 8:55260 (R;US)
Breeder reactor fuel reprocessing, 8:53473 (R;US)
Combined effects of atmospheric deposition, internal acid production, and harvesting on nutrient gains and losses from forest ecosystems, 8:54909 (R;US)
Comments on ISO/TC 97/SC 18/WG3 N120, 8:55331 (R;US)
Consolidation of tailings, 8:53654 (R;US)
Design considerations for long-term stabilization of uranium mill tailings impoundments, 8:53655 (R;US)
Detection of deletion mutations at the gpt locus in pSV2gpt transformed CHO cells, 8:55039 (R;US)
Effect of magnetic bending on the high-frequency stability of the ELMO Bumpy Torus, 8:55240 (R;US)
Effect of small-capacity, high-pressure injection systems on TQUV sequences at Browns Ferry Unit One, 8:54029 (R;US)
Electron-drift velocity and ionization and attachment coefficients in gases/mixtures for diffuse-discharge opening switches, 8:54550 (R;US)
Electron-ion collisions, 8:55239 (R;US)
Electron-molecule interactions in gases and liquids: the electron-attachment process in gases and nonpolar liquids, 8:55110 (R;US)
Ethanol production by Zymomonas mobilis, 8:53741 (R;US)
HIGHWAY, a transportation routing model: program description and users' manual, 8:53581 (R;US)
Isotope dependence of the breakdown strength of gases, 8:55109 (R;US)
Large climate-moderating envelopes for enclosed structures. A preliminary evaluation of energy-conservation potential, 8:54138 (R;US)
Modeling and simulation of energy-removal system for superconducting magnets, 8:55261 (R;US)
Neutral beam data systems at ORNL, 8:55285 (R;US)
PAFMOV: a PAFEC to MOVIE.BYU conversion, 8:55284 (R;US)
Parametric study of LH current drive for FED-A, 8:55237 (R;US)
PATRAM '83: 7th international symposium on packaging and transportation of radioactive materials, 8:53477 (R;US)
Phonon dispersion of transverse basal-plane modes in alkali-graphite compounds, 8:54253 (R;US)
Physical properties of SRC-I slurries under preheater conditions. Final report, 8:53348 (R;US)
Problems involved in the computer identification of replicate entries in TOXLINE, 8:55330 (R;US)
Problems of toxicological testing of complex mixtures, 8:53424 (R;US)
SCALE: a modular code system for performing standardized computer analyses for licensing evaluation, 8:53720 (R;US)
SCALE: a modular code system for performing standardized computer analyses for licensing evaluation, 8:53721 (R;US)
Semiconductor processing with excimer lasers, 8:53764 (R;US)
Shallow land burial handbook, 8:53642 (R;US)
Two types of values and their assessment by the collective interest, 8:54059 (R;US)
Use of DOE site selection criteria for screening low-level waste disposal sites on the Oak Ridge Reservation, 8:53674 (R;US)
Use of the cricket embryo (Acheta domesticus) as an invertebrate teratology model, 8:55069 (R;US)
Using PAFEC as a preprocessor for COSMIC/NASTRAN, 8:55286 (R;US)
Oak Ridge Y-12 Plant, TN (USA)
Calibration and use of a lung-monitoring facility using sodium iodide detectors, 8:55215 (R;US)
Contribution to ASTM C-26.05 Task Group: determination of impurities in uranium by ICP-AES after separation with TBP, 8:54303 (R;US)
Hierarchical trees for accelerated aging studies, 8:54204 (R;US)
Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H.
Dating of lake sediments by determination of the polonium-210 (lead-210) content, 8:55083 (R;AT;In German)
Office of Atomic Energy for Peace, Bangkok (Thailand)
Development of an analytical technique for the determination of traces of mercury by substoichiometric isotope dilution method, 8:54296 (R;TH)
Development of an analytical technique for the determination of traces of cadmium by substoichiometric isotope dilution technique, 8:54297 (R;TH;In Thai)
Development of preconcentration techniques for the determination of cadmium, copper, lead and zinc in sea water in conjunction with flame atomic absorption spectrophotometry, 8:54298 (R;TH)
Preliminary investigation of radiation level and some radionuclides in imported food and food products, 8:54295 (R;TH)
Office of Naval Research (USA). London Branch Office
Free electron laser research in Europe. Technical report, 8:54502 (R;US)
Office of Technology Assessment (U.S. Congress), Washington, DC
Industrial and commercial cogeneration, 8:54171 (R;US)
Materials information systems. Volume VI. Aluminum case study, 8:54237 (R;US)
Ohio State Univ., Columbus (USA)
US-West European energy and security relations, 8:54088 (R;US)
Ohio State Univ., Columbus (USA). Dept. of Chemistry
Mechanism and rates of the gas phase oxidations of sulfur dioxide and the nitrogen oxides in the atmosphere, 8:54887 (R;US)
Ohio State Univ., Columbus (USA). Dept. of Physics
Studies of chiral symmetry breaking in lattice gauge theory, 8:55155 (R;US)
Omaha Public Power District, NE (USA)
Evaluation and demonstration of methods for improved fuel utilization. Seventh semi-annual progress report, October 1, 1982-March 31, 1983, 8:53874 (R;US)
Open Univ., Milton Keynes (UK). Energy Research Group
A. D. C. F. analysis of a Totem based district heating scheme, 8:54189 (R;US)
Oregon State Univ., Corvallis (USA)
Preliminary study of a radiantly heated fluidized bed for the production of high-purity silicon, 8:53776 (R;US)
Oregon State Univ., Corvallis (USA). Dept. of Atmospheric Science
Regional Wind-Energy-Assessment Program. Progress report, October 1981-September 1982, 8:53843 (R;US)
Regional Wind-Energy-Assessment Program. Progress report, October 1981-September 1982. Appendix. Wind statistic summaries, 8:53844 (R;US)
Oregon State Univ., Corvallis (USA). Dept. of Nuclear Engineering
Studies on the properties of hard-spectrum, actinide fissioning reactors. Final report, 8:53913 (R;US)
Study of the behavior of actinides continuously recycled in a hard spectrum reactor, 8:53912 (R;US)
Oregon State Univ., Corvallis (USA). Dept. of Physics
Thermal-energy scattering of atoms in high Rydberg states. Final report, 8:55113 (R;US)
Osaka Univ. (Japan)
Neutrino-oscillation experiments at Brookhaven National Laboratory, 8:55127 (R;US)

P

Pacific Northwest Lab., Richland, WA (USA)
Application of the TEMPEST computer code for simulating hydrogen distribution in model containment structures, 8:54035 (R;US)
Assessment of cold-climate environmental research priorities, 8:54062 (R;US)
Candidate wind-turbine generator site cumulative meteorological data summary and data for January 1982 through September 1982, 8:53851 (R;US)
Detecting long-term ecological effects in forests and food chains, 8:54911 (R;US)
Development of a hot-gas-cleanup system for integrated coal-gasification/molten-carbonate fuel-cell power plants. Quarterly progress report, April-June 1983, 8:54115 (R;US)
Energy strategy selector for small office building design, 8:54145 (R;US)

Engineering factors influencing Corbicula fouling in nuclear-service water systems, 8:53869 (R;US)
Experimental results and operational characteristics of heat exchangers in dry/wet operations, 8:54523 (R;US)
Identification of mutagenic constituents in coal combustion fly ash, 8:53428 (R;US)
Innovative industrial-materials processes, 8:54175 (R;US)
List of DOE radioisotope customers with summary of radioisotope shipments, FY 1982, 8:53731 (R;US)
Management of QA in an R and D organization, 8:55327 (R;US)
Monitored retrievable storage: a waste management option for spent fuel and high-level wastes, 8:53679 (R;US)
NO/sub x/ information book, 8:54903 (R;US)
Note on homogeneity tests when combining 2 x 2 tables, 8:54982 (R;US)
Permian potentiometric analysis, 8:53676 (R;US)
Population dose commitments due to radioactive releases from nuclear power plant sites in 1980, 8:53952 (R;US)
Potential low-level waste disposal limits for activation products from fusion, 8:53677 (R;US)
Predictive geochemical modeling of interactions between uranium-mill-tailings solutions and sediments in a flow-through system: model formulations and preliminary results, 8:54926 (R;US)
Proposed new energy standard for commercial buildings, 8:54144 (R;US)
State-of-the-art of furnace recuperation in the primary metals industry: technical briefing report, 8:54174 (R;US)
Survey of statistical and sampling needs for environmental monitoring of commercial low-level radioactive waste disposal facilities, 8:53678 (R;US)
Validation of the WATEQ4 geochemical model for uranium, 8:53675 (R;US)
Weighted nonparametric tail estimation procedures, 8:55227 (R;US)

PAFEC Engineering Consultants, Knoxville, TN (USA)
Using PAFEC as a preprocessor for COSMIC/NASTRAN, 8:55286 (R;US)

Pakistan Inst. of Nuclear Science and Technology, Islamabad. Health Physics Div.
Code of practice against radiation hazards at PINSTECH, 8:55213 (R;PK)
Levels of strontium 90 in the environment at PINSTECH (Period 1979-1980), 8:54927 (R;PK)

Pakistan Inst. of Nuclear Science and Technology, Rawalpindi. Nuclear Chemistry Div.
Emission spectrographic carrier distillation technique for the determination of trace elements in nuclear fuel materials, 8:53471 (R;PK)

Paris-11 Univ., 91 - Orsay (France)
Contribution to the minimization of time for the solution of algebraic differential equations system, 8:55230 (R;FR;In French)

PEDCo-Environmental, Inc., Cincinnati, OH (USA)
Industrial process profiles for environmental use: Chapter 30. The electronic component manufacturing industry. Final report, 8:54960 (R;US)

Pennsylvania State Univ., University Park (USA)
Control of blackwater in coal preparation plant recycle and discharge. Open file report Oct 79-Sep 82 (final), 8:53390 (R;US)
Evaluation of clays and clay minerals for application to repository sealing, 8:53672 (R;US)

Pennsylvania State Univ., University Park (USA). Coal Research Section
Data base for the analysis of compositional characteristics of coal seams and macerals. Quarterly technical progress report, May-July 1982, 8:53399 (R;US)
Dependence of liquefaction behavior on coal characteristics. Part IV. Contributions to the understanding of the phenomenology of coal liquefaction. Final technical report, March 1981-February 1984, 8:53342 (R;US)

Pennsylvania State Univ., University Park (USA). Dept. of Agricultural Engineering
Diesel-engine fumigation with aqueous ethanol, 8:54198 (R;US)

Pennsylvania Univ., Philadelphia (USA)
High-energy photoproduction of states containing heavy quarks and other rare phenomena, 8:55137 (R;US)
Neutrino-oscillation experiments at Brookhaven National Laboratory, 8:55127 (R;US)
Positron ring system using one-dimensional Anger-type detectors. Progress report, January 1, 1983-December 31, 1983, 8:54676 (R;US)

Physics International Co., San Leandro, CA (USA)
Scientific program and abstracts, 8:54604 (R;US)

Physikalisch-Technische Bundesanstalt, Braunschweig (Germany, F.R.). Forschungs- und Messreaktor
Report on the operation of the FMRB reactor and related activities in the year 1981, 8:53982 (R;DE;In German)

Pickard-Lowe and Garrick, Inc., Irvine, CA (USA)
Heber Geothermal Binary Demonstration Project. Final design availability assessment. Revision 1, 8:53834 (R;US)

Pittsburgh Univ., PA (USA). Dept. of Chemical and Petroleum Engineering
Oxydesulfurization of coal. Final report, 8:53414 (R;US)

Pittsburgh Univ., PA (USA). University Center for Social and Urban Research
Some ecological contexts of attitudes concerning issues of civil defense. Final report, 8:55348 (R;US)

Polysystems Analysis Corp., Huntington, NY (USA)
Mathematical model of a utility firm. Executive summary, 8:54099 (R;US)
Mathematical model of a utility firm. Final technical report, Part I, 8:54073 (R;US)
Mathematical model of a utility firm. Final technical report, Part IIA, 8:54098 (R;US)
Mathematical model of a utility firm. Final technical report, Part IIB, 8:54101 (R;US)
Mathematical model of a utility firm. Final technical report, Part III, 8:54100 (R;US)

Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan)
β rays dosimetry with stack type detectors in β and γ rays mixed fields, 8:54733 (R;JP;In Japanese)
Current status of Japanese research and development activity and program plan on failed fuel detection and location systems for LMFBR, 8:53900 (R;JP)
Current status on the development of sodium boiling detection system in Japan, 8:53946 (R;JP)
Field in situ vibration testing of JOYO heat transport system piping, 8:53974 (R;JP)
Gas tagging system development in Japan, 8:53902 (R;JP)
Integrated leak rate test results of JOYO reactor containment vessel, 8:53975 (R;JP)
JOYO reactor technology progress report, Volume 5. April - June 1981, 8:53981 (R;JP;In Japanese)
Material surveillance program of JOYO, 8:53970 (R;JP)
Measurement of the radioactive aerosol diameter by position sensitive detectors, 3, 8:54734 (R;JP;In Japanese)
Measurements of neutron and gamma ray streaming through a duct, (2), (3), 8:53976 (R;JP;In Japanese)
Nuclear reactor technology progress report, Volume 2. July-September 1980, 8:53978 (R;JP;In Japanese)
Nuclear reactor technology progress report, Volume 3. October - December, 1980, 8:53979 (R;JP;In Japanese)
Nuclear reactor technology progress report, Volume 4. January - March, 1981, 8:53980 (R;JP;In Japanese)
Operating experiences and present activities of JOYO, 8:53969 (R;JP)
Operation experiences of JOYO fuel failure detection system, 8:53971 (R;JP)
Post irradiation examination of JOYO fuel subassemblies, 8:53972 (R;JP)
Simulation study of neutronic and acoustic methods of boiling detection, 8:53948 (R;JP)
Studies on modeling to failed fuel detection system response in LMFBR, 8:53977 (R;JP)
Summary of in-pile loop experiments related to the development of the fuel failure detection systems for LMFBR in Japan, 8:53901 (R;JP)
Thermal and hydraulic experiments of JOYO fuel subassembly, 8:53973 (R;JP)
Transmission experiment by the simulated LMFBR model and propagation analysis of acoustic signals, 8:53947 (R;JP)

Princeton Univ., NJ (USA). Plasma Physics Lab.
Dielectronic satellite spectra of hydrogen-like titanium (Ti XXII), 8:55246 (R;US)
Spectrum of resistive MHD modes in cylindrical plasmas, 8:55245 (R;US)

Puerto Rico Univ., Mayaguez. Dept. of Civil Engineering
Renewable energy technologies: models in the energy planning for Puerto Rico, 8:54112 (R;US)
Purdue Univ., Indianapolis, IN (USA)
Energy and materials flows in the iron and steel industry, 8:54159 (R;US)
Purdue Univ., Lafayette, IN (USA)
Swelling and gas release of grain-boundary pores in uranium dioxide, 8:54255 (R;US)
Purdue Univ., Lafayette, IN (USA). School of Chemical Engineering
Macromolecular structural changes in bituminous coals during extraction and solubilizatio. Final technical report, September 1, 1980-August 31, 1983, 8:53369 (R;US)
Purdue Univ., Lafayette, IN (USA). School of Electrical Engineering
Decentralized control of large transient in power systems: theory and application. Final report, January 1981-August 1983, 8:53855 (R;US)
Purdue Univ., Lafayette, IN (USA). School of Mechanical Engineering
Thermal and radiative properties of coal-ash deposits. Technical progress report No. 7, June 1, 1983-August 31, 1983, 8:53370 (R;US)
Purdue Univ., Lafayette, IN (USA). School of Nuclear Engineering
Mechanisms of elevated-temperature rupture in single-phase ceramics. Progress report, February 1, 1983-January 31, 1984, 8:54254 (R;US)
Purdue Univ., Lafayette, IN (USA). Thermophysical and Electronic Properties Information Center
Analysis of thermal conductivity data for fourteen elements in normal and superconducting states. State-of-the-art report, 8:54206 (R;US)
Electrical resistivity of vanadium and zirconium. State-of-the-art report, 8:54207 (R;US)

R

Radian Corp., Austin, TX (USA)
Fugitive emission testing at the Kosovo coal gasification plant. Final task report Apr 79-Sep 81, 8:53349 (R;US)
Full-scale utility FGD (flue gas desulfurization) system adipic acid demonstration program. Volume 1. Process results. Final report Jun 80-Nov 82, 8:53391 (R;US)
Full-scale utility FGD (flue gas desulfurization) system adipic acid demonstration program. Volume 2. Continuous emissions monitoring results. Final report Jun 80-Nov 82, 8:53392 (R;US)
Rebel Marine Service, Inc., Norfolk, VA (USA)
Reduction of energy needs for fish harvesting through the use of sails on fishing vessels, 8:54173 (R;US)
Rensselaer Polytechnic Inst., Troy, NY (USA)
Efficient technique for calculating multiple solutions of electric-field problems. Part I. Final report, 8:55221 (R;US)
Efficient technique for calculating multiple solutions of electric-field problems. Part II. Corrections and modifications of the WINDOW program. Final report, 8:55222 (R;US)
Rensselaer Polytechnic Inst., Troy, NY (USA). Dept. of Physics
Photon scattering and interaction analysis for interfacial corrosion and catalysis. Technical progress report, September 1, 1982-August 31, 1983, 8:54048 (R;US)
Resource Planning Associates, Inc., Cambridge, MA (USA)
Influence of corporate strategy on the decision to proceed with district heating: case study of Toledo Edison Company, 8:54184 (R;US)
RE/SPEC, Inc., Rapid City, SD (USA)
Preliminary investigation of the structural influence of entry-entry intersections and inhomogeneous initial-stress fields on repository disposal rooms, 8:53660 (R;US)
Risoe National Lab., Roskilde (Denmark)
Weathering and decontamination of radioactivity deposited on asphalt surfaces, 8:54345 (R;DK)
Roberts and Eichler Associates, Inc., Atlanta, GA (USA)
Area development plan for Radio Island, 8:54060 (R;US)
Rochester Univ., NY (USA)
Microwaves, hyperthermia, and human leukocyte function. Final report, August 1979-June 1982, 8:55072 (R;US)
Rochester Univ., NY (USA). Dept. of Mechanical Engineering
Dynamical phenomena in sunspots. Final report 1 Mar-31 Jul 82, 8:55086 (R;US)
Rockwell International Corp., Newbury Park, CA (USA). Environmental Monitoring and Services Center
Los Angeles field modeling and measurement study - 1976 (first year). Final report, 8:54883 (R;US)
Los Angeles field modeling and measurement study - 1978 (second year). Final report, 8:54884 (R;US)
Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations
Preliminary interpretation of the tectonic stability of the reference repository location, Cold Creek syncline, Hanford Site, 8:53680 (R;US)
Rockwell Hanford Operations. Defense waste and byproducts management monthly report, 8:53681 (R;US)
Rockwell Hanford Operations monthly report summary, June 1983, 8:53474 (R;US)
Royal Military Coll. of Science, Shrivenham (UK)
Ion beam measurements of depth profiles of deuterium concentration in steels. Pt.1: investigation of 18Ni250 high temperature aged martensitic steel, 8:54301 (R;GB)
Ion beam measurements of depth profiles of deuterium concentration in steels. Pt.II: investigation of stainless steel types 304L and EN58E and conclusions of parts I and II, 8:54302 (R;GB)
Russell and Sons Construction Co., Inc., Eureka, KS (USA)
Reduction of land recontouring costs. Volume I. Texas lignite field. Open file report Sep 78-Jan 81, 8:53395 (R;US)
Reduction of land recontouring costs. Volume II. bituminous coal field, northeast Arizona. Open file report Feb 79-Jun 82, 8:53396 (R;US)

S

Saginaw Valley State Coll., University Center, MI (USA). Dept. of Physics
Transient heat transfer in coated superconductors. Final scientific report 1 Jun 81-1 Sep 82, 8:55220 (R;US)
Saint Louis Univ., MO (USA). Dept. of Earth and Atmospheric Sciences
Attenuation of seismic waves at regional distances. Final technical report 1 Oct 78-30 Sep 82, 8:54872 (R;US)
Saint Regis Paper Co., Pensacola, FL (USA). Technical Operations Div.
Evaluation of hydropyrolysis as an energy-saving alternative to the Tomlinson furnace. Task III. Chemical causes of increased pulp yield, 8:54160 (R;US)
Evaluation of hydropyrolysis as an energy-saving alternative to the Tomlinson furnace. Task II. Chemistry of hydropyrolysis, 8:54161 (R;US)
Sandia National Labs., Albuquerque, NM (USA)
Advanced reactor safety research. Quarterly report, October-December 1981. Volume 20, 8:54027 (R;US)
Alkali depletion and ion-beam mixing in glasses, 8:54281 (R;US)
Ampfion hybrid diodes on Hydramite and PBFA-I, 8:55297 (R;US)
Analysis of mechanisms for anode plasma formation in ion diodes, 8:55296 (R;US)
Applied-B ion diode experiments on PBFA I, 8:55299 (R;US)
Beam-target interaction of intense ion beams: theory and experiment, 8:55304 (R;US)
Chemical properties of metallic glasses, 8:54239 (R;US)
Computerized manufacturing: the impact of high technology implication for the work force, 8:55340 (R;US)
Construction and verification of a finite-element method for nonisothermal flows in porous media, 8:54524 (R;US)
Corrosion response of downhole steam generator assembly and instrumentation and supply line tubings at Long Beach field test, 8:53434 (R;US)
Detonation of hydrogen-air mixtures, 8:54036 (R;US)
Diagnosing the ion beam on the Applied-B diode, 8:55300 (R;US)
Double porosity model for acoustic wave propagation in fractured-porous rock, 8:55228 (R;US)
DRAMIN: transferring data from the Applicon graphic system to a DRAM input file. User guide, 8:55339 (R;US)

Effects of future energy scenarios on photovoltaic energy value, 8:53761 (R;US)
Epidemiology applied to health physics, 8:55003 (R;US)
Hermetically sealed microminiature multisocket connector, 8:54552 (R;US)
IBEX - a pulsed power accelerator that generates no prepulse, 8:54566 (R;US)
Ion stopping in heated targets, 8:55302 (R;US)
Light-ion-beam fusion, 8:55305 (R;US)
Logical framework for identifying equipment important to safety in nuclear power plants, 8:54028 (R;US)
Mechanics of fracture under high-rate stress loading, 8:55081 (R;US)
NaOH-rich corner of the (Na^+, Ca^{2+}) (OH^-, CO_3^{2-}) reciprocal system, 8:54031 (R;US)
Overview of ion-diode research, 8:55298 (R;US)
Piezometer-probe technology for geotechnical investigations in coastal and deep-ocean environments, 8:54769 (R;US)
Potential for containment leak paths through electrical penetration assemblies under severe accident conditions, 8:54030 (R;US)
Retention and thermal release of deuterium implanted in beryllium, 8:55303 (R;US)
SAFE users manual. Volume 4. Computer programs, 8:53718 (R;US)
Some design considerations for cask handling at large-scale shipping and receiving facilities, 8:53713 (R;US)
Transient response of circular-foil heat-flux gages, 8:54768 (R;US)
Transporting spent reactor fuel: allegations and responses, 8:53582 (R;US)
Using inner-shell x-rays as an ion-beam diagnostic, 8:55301 (R;US)

Sandia National Labs., Livermore, CA (USA)
Computerized art plotting system. Vol. I. Horizontal bar charts (second edition), 8:55341 (R;US)
Gauge block lasometer development, 8:54770 (R;US)

San Fernando Observatory, Sylmar, CA (USA)
Studies of solar flares and erupting filaments. Final report 1 Jul 76-30 Sep 81, 8:55087 (R;US)

Sangamon State Univ., Springfield, IL (USA)
Energy for Illinois. Final report, 8:54192 (R;US)

Science and Engineering Research Council, Chilton (UK). Rutherford Appleton Lab.
Energy storage for wind-generator application, 8:53849 (R;US)

Science Applications, Inc., Boulder, CO (USA). Plasma Research Inst.
Electron orbits in a free electron laser with a longitudinal magnetic wiggler. Technical report, 8:54501 (R;US)

Science Applications, Inc., Chatsworth, CA (USA). Combustion Science and Advanced Technology Dept.
Effect of fuel gas composition on appliance performance. Topical report Jul 78-Dec 82, 8:53447 (R;US)

Science Applications, Inc., La Jolla, CA (USA)
Parametric effects on nondestructive-assay techniques. Final report, 8:53719 (R;US)
Photoemission yields of liquids in the vacuum ultraviolet, 8:55114 (R;US)

Science Applications, Inc., McLean, VA (USA)
Review and assessment of reduced emissions/clean burning diesel engines for integration into the Army inventory. Final technical report, 8:54195 (R;US)
Technical and economic assessment of liquid-fuel production from biomass. Final research report, 8:53774 (R;US)

Science Applications, Inc., McLean, VA (USA). Center for Soviet Studies
Soviet crisis relocation program. Final report 1 May 82-Jun 83, 8:55346 (R;US)

Science Applications, Inc., Oak Ridge, TN (USA)
Photoemission yields of liquids in the vacuum ultraviolet, 8:55114 (R;US)

Scientific Service, Inc., Redwood City, CA (USA)
Industrial hardening: 1982 technical status report. Final report, 8:55347 (R;US)
Research on upgrading structures for host and risk area shelters, phase II. Final report, 8:54373 (R;US)

SCS Engineers, Inc., Covington, KY (USA)
Remedial actions at hazardous waste sites: survey and case studies. Final report, 8:54942 (R;US)

S-Cubed, La Jolla, CA (USA)
Magnitude/yield variability in the western United States: analysis of the Rulison/Gasbuggy anomaly. Final report 1 Dec 81-30 Nov 82, 8:54869 (R;US)

Seaward International, Inc., Falls Church, VA (USA)
Development of a flaring burner disposal system. Final report, 8:53438 (R;US)

SINTEF, Trondheim (Norway)
Fluidised bed combustion. an overview of the Norwegian program, 8:53421 (R;US)
Modeling of hydrocarbon fires. Subreport No. 1, 8:53739 (R;US)

Solar Energy Research Inst., Golden, CO (USA)
Advances in photovoltaics R and D: an overview, 8:53782 (R;US)
Conceptual design of a 20-acre salt-gradient solar pond system for electric power production at Truscott, Texas, 8:53792 (R;US)
Evaluation of nondistillation ethanol-separation processes, 8:53744 (R;US)
Graphical method for determining interflected daylight in clear climates, 8:53758 (R;US)
Review of potential satellite techniques for mesoscale mapping of insolation, 8:53759 (R;US)

Solar Physics Research Corp., Tucson, AZ (USA)
Quantitative study of magnetic flux transport on the sun, 8:55088 (R;US)

Southern Illinois Univ., Carbondale (USA)
Surface mining environmental monitoring and reclamation handbook, 8:53400 (R;US)

Southwest Research Inst., San Antonio, TX (USA). Army Fuels and Lubricants Research Lab.
Evaluation of four lubricants using a modified Federal Test Method 354 test procedure. Interim report August 80-December 80, 8:54194 (R;US)

SRI International, Menlo Park, CA (USA)
Validation of the Cumberland Energyplex concept. Volume 3. Appendixes. Final report, 8:54163 (R;US)
Validation of the Cumberland Energyplex concept. Volumes 1 and 2. Executive summary and analysis detail. Final report, 8:54164 (R;US)

Staatsbuergerlichen Vereinigung 1954 e.V., Koeln (Germany, F.R.)
Political framework conditions of research and technology, 8:54071 (R;DE;In German)

Standards Institution of Malaysia, Kuala Lumpur
Specification for symbol for ionizing radiation, 8:55211 (R;MY)

Stanford Linear Accelerator Center, CA (USA)
Coherent instabilities of a relativistic bunched beam, 8:54593 (R;US)
Forced two-phase cooling of the TPC superconducting solenoid, 8:54477 (R;US)
New heavy-ion-fusion accelerator research program, 8:55306 (R;US)
SLAC analog status monitor Mod II (Engineering Materials), 8:54635 (E;US)
SLAC 200-kW Copper Sphere Beam Dump (100 kW actual): SA-901-061-01-R2 Subassembly; CK-082-783-00-R0 Auxiliary Drawing List (Engineering Materials), 8:54601 (E;US)
SLAC 60kW sub-booster klystron and permanent magnet (Engineering Materials), 8:54599 (E;US)
SLAC M TAC M SHAM Auxiliary Backplane No. 2 (Engineering Materials), 8:54600 (E;US)
SLAC RHONDA-TAC test router module: LD 135-396-00-R0 Logic Diagram (Engineering Materials), 8:54598 (E;US)
SLAC TAC shift register tester: LD 135-397-00-R0 Logic Diagram (2 sheets) (Engineering Materials), 8:54668 (E;US)
SLAC trigger distribution detector/transmitter: DL-208-503-00-R1 Drawing List (Engineering Materials), 8:54636 (E;US)
SLAC users bulletin No. 95, March-July 1983, 8:54605 (R;US)
Status of the iota (1440) and θ (1640) as gluonium candidates, 8:55141 (R;US)
Tau and B lifetime measurements from the MARK II, 8:55142 (R;US)

Stanford Univ., CA (USA)
Proceedings of the 1980 Heat Transfer and Fluid Mechanics Institute, 8:54519 (R;US)
Program for developing professional capabilities in energy-conservation policy analysis. Final report, September 1979-December 1980, 8:54054 (R;US)
Search for rare decay modes of the muon, 8:54675 (R;US)

Stanford Univ., CA (USA). Dept. of Geophysics
Improvements in geothermometry. Final technical report. Rev., 8:53841 (R;US)
Stanford Univ., CA (USA). Edward L. Ginzton Lab.
Research studies on radiative collisional processes. Final report, 1 October 1979-30 September 1982, 8:54498 (R;US)
Stanford Univ., CA (USA). Stanford Geothermal Program
Proceedings of fifth workshop on Geothermal Reservoir Engineering, 8:53837 (R;US)
State Univ. of New York, Stony Brook (USA)
Neutrino-oscillation experiments at Brookhaven National Laboratory, 8:55127 (R;US)
Stone and Webster Engineering Corp., New York (USA)
Preliminary assessment of the healing of fractures in salt, 8:53662 (R;US)
Strasbourg-1 Univ., 67 (France). Centre de Recherches Nucleaires
Photoelectron-photon coincidences in anthracene crystals, 8:54674 (R;FR)
Stuttgart Univ. (Germany, F.R.). Inst. fuer Kernenergetik und Energiesysteme
Design calculations for a gas pipeline for the transport of solar-produced hydrogen over large distances taking non-stationary operating conditions into account, 8:53737 (TG;US)
Suntech, Inc., Marcus Hook, PA (USA). Applied Research Dept.
Assessment of ether and alcohol fuels from coal. Volume I. Summary. Final report, 8:53742 (R;US)
Refining to high yields of jet fuel from shale oil. Final report, 8:53460 (R;US)
Synergic Resources Corp., Bala-Cynwyd, PA (USA)
Industrial electricity conservation potential in the Pacific Northwest. Final report. Volume II. Appendices, 8:54181 (R;US)
Industrial-electricity-conservation potential in the Pacific Northwest. Volume I. Final report, 8:54180 (R;US)

T

Technische Hochschule Aachen (Germany, F.R.)
Investigation of a high-temperature reactor with a central region of graphite-spheres, 8:53918 (R;DE;In German)
Technische Hochschule Aachen (Germany, F.R.). Fakultaet fuer Elektrotechnik
Study on a drive with synchronous engine for electric powered vehicles, 8:54200 (R;DE;In German)
Technische Hochschule Aachen (Germany, F.R.). Fakultaet fuer Maschinenwesen
Improving the torque behaviour of exhaust gas-turbocharged vehicle diesel engines, 8:54199 (R;DE;In German)
Technische Hogeschool Delft (Netherlands)
Ondergrondse pomp accumulatie centrale in nederland: vooronderzoek (Pumped Storage hydroelectric plants with underground reservoirs in the Netherlands: preliminary report), 8:53754 (R;US)
Technische Hogeschool Delft (Netherlands). Afdeling der Werktuigbouwkunde
CO_2-recovery from flue gases, 8:54886 (R;US)
Technische Univ. Berlin (Germany, F.R.). Fachbereich Umweltttechnik
Energy balance of buildings, 8:54140 (R;DE;In German)
Technische Univ., Dresden (German Democratic Republic). Sektion Physik
Calculation of fusion cross sections, 8:55175 (R;DD;In German)
Calculation of the neutron sensitivity of thermoluminescent detectors. 1. Fundamentals, 8:54738 (R;DD;In German)
Calculation of the neutron sensitivity of thermoluminescent detectors. 2. Relative light conversion ratio for various thermoluminescent detectors as a function of the LET, 8:54739 (R;DD;In German)
Calculation of the neutron sensitivity of thermoluminescent detectors. 3. Sensitivity of radiator-detector combinations for fast neutrons, 8:54740 (R;DD;In German)
Calculation of the neutron sensitivity of thermoluminescent detectors. 4. Lithium fluoride albedo dosemeter, 8:54741 (R;DD;In German)
Calibration of a special emergency neutron dosemeter based on organic solid-state track detectors, 8:55214 (R;DD;In German)
Calibration of a special neutron dosemeter based on solid-state track detectors and fission radiators in various neutron fields, 8:54742 (R;DD;In German)
Determination of the secondary radiation field of the Dubna synchrocyclotron, 8:54623 (R;DD;In German)
Device for evaluating solid-state track detectors by means of light transmission measurements, 8:54737 (R;DD;In German)
Homogeneous TL dosemeter for direct reading of the biological radiation exposure in mixed neutron-gamma fields, 8:54735 (R;DD;In German)
Model for calculating the neutron sensitivity of organic solid-state track detectors, 8:54745 (R;DD;In German)
Multi-channel spark counter for reading neutron dosemeters with plastic track detectors, 8:54744 (R;DD;In German)
Physical fundamentals for evaluating neutron-irradiated solid-state track detectors by light transmission measurements, 8:54736 (R;DD;In German)
Study of the properties of cellulose triacetate foils used as solid-state track detectors for neutrons, 8:54743 (R;DD;In German)
Technische Univ. Muenchen, Garching (Germany, F.R.). Fakultaet Physik
High-sensitivity mass spectrometry with a tandem accelerator, 8:54603 (R;US)
Tennessee Univ., Knoxville (USA)
Modeling and simulation of energy-removal system for superconducting magnets, 8:55261 (R;US)
Tennessee Univ., Knoxville (USA). Dept. of Civil Engineering
Reactivity of fly ashes in a spray dryer FGD process, 8:53386 (R;US)
Tennessee Univ., Knoxville (USA). Dept. of Physics and Astronomy
Photoemission yields of liquids in the vacuum ultraviolet, 8:55114 (R;US)
Tennessee Univ., Oak Ridge (USA). Graduate School of Biomedical Sciences
Detection of deletion mutations at the gpt locus in pSV2gpt transformed CHO cells, 8:55039 (R;US)
Tennessee Univ., Tullahoma (USA). Space Inst.
Numerical investigation of recirculation in the UTSI MHD combustor, 8:54113 (R;US)
Tennessee Valley Authority, Chattanooga (USA)
TVA's dispersed generation protection requirements - what do they mean, 8:54104 (R;US)
Tennessee Valley Authority, Chattanooga (USA). Office of Natural Resources
Techniques for reaeration of hydropower releases. Final report Oct 80-Apr 82, 8:53756 (R;US)
Tennessee Valley Authority, Chattanooga (USA). Office of Power
Energy recovery from natural-gas pressure-regulator stations, 8:53446 (R;US)
Texas Instruments, Inc., Dallas (USA). Central Research Lab.
Development of a solar-energy system. First annual report, 8:53770 (R;US)
Texas Tech Univ., Lubbock (USA). Dept. of Mechanical Engineering
Dynamic-stall regulation of the Darrieus turbine, 8:53852 (R;US)
Texas Univ., Arlington (USA). Dept. of Aerospace Engineering
MHD generator off-design performance and NO/sub x/ chemical-kinetics analysis, 8:54116 (R;US)
Texas Univ., Austin (USA). Center for Energy Studies
Influence of residential solar water heaters on electric-utility peak demand, 8:53811 (R;US)
Texas Univ., Austin (USA). Fusion Research Center
Observations of soft x-ray fluctuations with an imaging array on TEXT, 8:55244 (R;US)
THUMS Long Beach Co., CA (USA)
Improved secondary oil recovery by controlled waterflooding-pilot demonstration: Ranger Zone, Fault Block VII, Wilmington Field. Phase IV. Quarterly report, April-June 1983, 8:53433 (R;US)
Tokyo Univ., Tanashi (Japan). Inst. for Cosmic Ray Research
Hadronic interactions at energies around 10^3 TeV inferred from the large-scale emulsion chamber experiment at Mt. Fuji, 8:55147 (R;JP)
Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study
Calibration of the energy indicator system of INS 1.3 GeV electron synchrotron, 8:54609 (R;JP;In Japanese)
Development of a new digital divider system for the charge division method, 8:54688 (R;JP;In Japanese)

High resolution position detecting system with a SWPC for electron spectroscopy, 8:54685 (R;JP)
Measurement of the RF field on RFQ linac model cavities, 8:54581 (R;JP)
Measuring system of multipole fields of the quadrupole magnet in drift-tubes of a linear accelerator, 8:54582 (R;JP)
Noise reduction in the beam current monitor, 8:54610 (R;JP)
Nuclear physics experiment at INS, 8:55165 (R;JP)
Proposal of new avalanche mode detector for high energy heavy ion and particle physics experiments, 8:54689 (R;JP;In Japanese)
Study of fine dE/dX sampling with a longitudinal drift chamber, 8:54686 (R;JP)
Subsidiary FORTRAN subroutines at INS CAMAC system, 8:54608 (R;JP;In Japanese)
Theoretical analysis of charge division proportional counter, 8:54687 (R;JP;In Japanese)

Toronto Univ., Ontario (Canada). Inst. for Aerospace Studies
Application of laser resonance saturation to the development of efficient short wavelength lasers. Annual report for period ending 30 Sep 82, 8:54491 (R;US)

Tracor Jitco, Inc., Rockville, MD (USA)
Chemical selection methods: an annotated bibliography - second edition. Toxics integration information series (final), 8:55344 (R;US)

Transport and Road Research Lab., Crowthorne (UK)
Surface characteristics of roads resurfaced using the repave process. Final report, 8:54155 (R;US)

TRC Environmental Consultants, Inc., East Hartford, CT (USA)
Application of a coal-pile drainage model to an industrial/institutional site, 8:53418 (R;US)

TRW Defense and Space Systems Group, Redondo Beach, CA (USA). Space Sciences Dept.
Project to develop an index of pc 3,4,5 geomagnetic pulsations and to study their control by solar wind parameters. Final report, 8:55100 (R;US)

TRW, Inc., Redondo Beach, CA (USA)
Control technology appendices for pollution control technical manuals. Final report, June 1982-February 1983, 8:53389 (R;US)

TRW Space and Technology Group, Redondo Beach, CA (USA). Applied Technology Div.
Applications of Josephson junction SQUIDS (superconducting quantum interference device) and arrays. Annual progress report No. 1, 1 September 81-30 September 82, 8:54370 (R;US)
Demonstration of SQUID (superconducting quantum interference device) parametric amplifier. Annual report No. 1, 14 September 81-14 September 82, 8:54371 (R;US)

U

UKAEA Atomic Energy Establishment, Winfrith
Wide range in-core neutron measurement system used in the Windscale AGR concluding experiments, 8:53882 (R;XA)

UKAEA Atomic Energy Research Establishment, Harwell. Environmental and Medical Sciences Div.
Radioactive waste disposal by UKAEA establishments during 1981 and associated environmental monitoring results, 8:53603 (R;GB)

UKAEA Atomic Energy Research Establishment, Harwell. Materials Development Div.
Preliminary assessment of polymer-modified cements for use in immobilisation of intermediate level radioactive waste, 8:53602 (R;GB)
Radiation stability of plastics and rubbers, 8:54267 (R;GB)

UKAEA Atomic Energy Research Establishment, Harwell. Nuclear Physics Div.
Fundamental physics research at Harwell in the 1950s. 1. The Independent Research Group (Nuclear Physics Division), 8:55084 (R;GB)

UKAEA Headquarters, London
Fuel temperature measurement in the WAGR, 8:53880 (R;XA)
TWIST: a computer program to calculate errors due to degradation of insulation resistance of mineral insulated thermocouple cables, 8:53930 (R;XA)
Use of chromel-alumel thermocouples in high temperature experiments in WAGR, 8:53879 (R;XA)

Ultrasystems, Inc., Irvine, CA (USA)
Boiler control systems oxygen trim systems manual. Final report fy 82, 8:54156 (R;US)

Union Carbide Corp., Oak Ridge, TN (USA). Nuclear Div.
Isolation of an active site peptide from spinach ribulose bisphosphate carboxylase/oxygenase modified by glyoxylate, 8:54962 (R;US)
Response of the North American corn belt to climatic warming, CO_2, 8:54881 (R;US)
Review of the beta situation, 8:55236 (R;US)

United Nations Industrial Development Organization, Vienna (Austria)
Chinese experiences in small mini hydro power generation, 8:53747 (R;US)
Metallurgical coal in the 1980's - facts and prospects, 8:53423 (R;US)

United Nuclear Industries, Inc., Richland, WA (USA)
Isotopic composition of irradiated Mark IV and Mark IA fuel, 8:53984 (R;US)

United Technologies Corp., South Windsor, CT (USA). Power Systems Div.
On-site fuel cell field test support program. Annual report Jul 81-Jun 82, 8:54121 (R;US)

United Technologies Research Center, East Hartford, CT (USA)
Preliminary feasibility evaluation of compressed-air-storage power systems. Volume II. Appendices, period June 1975-December 1976, 8:54042 (R;US)
Theoretical studies of kinetic mechanisms of negative ion formation in plasmas. Final technical report 15 Jan 81-15 Jan 83, 8:55104 (R;US)

University of Southern California, Los Angeles (USA). Dept. of Materials Science
Investigation of impurity concentrations and electrical properties near interfaces. Final report 1 Feb 81-31 Aug 82, 8:55102 (R;US)

Urban Inst., Washington, DC (USA)
Economic feasibility of alternative utility-sponsored weatherization programs: the case of baltimore gas and electric company. Final report, 8:54141 (R;US)

Urban Systems Research and Engineering, Inc., Cambridge, MA (USA)
Potential for salt-gradient solar ponds in New York State. Final report, 8:53808 (R;US)

USDOE Assistant Secretary for Conservation and Renewable Energy, Washington, DC
Supplement to: March 1982 consumer products efficiency standards, engineering analysis and economic analysis documents, 8:54135 (R;US)

USDOE Bartlesville Energy Technology Center, OK
Assessment of gamma-inject logging techniques for the determination of residual oil saturation. Final report, 8:53431 (R;US)

USDOE Energy Information Administration, Washington, DC. Office of Coal, Nuclear, Electric and Alternate Fuels
1982 survey of United States uranium marketing activity, 8:53600 (R;US)
Coal supply and transportation model. Executive summary, 8:53413 (R;US)
Cost and quality of fuels for electric utility plants: 1982 annual, 8:54095 (R;US)
Electric Power Monthly, 8:54096 (R;US)
Electric Power Quarterly, January-March 1983, 8:54097 (R;US)

USDOE Energy Information Administration, Washington, DC. Office of Energy Markets and End Use
State Energy Overview, 8:54080 (R;US)

USDOE Energy Information Administration, Washington, DC. Office of Oil and Gas
Indexes and estimates of domestic well drilling costs, 1982 and 1983, 8:53444 (R;US)
Natural gas monthly, 8:53445 (R;US)
Petroleum marketing monthly, 8:54058 (R;US)

USDOE Morgantown Energy Technology Center, WV
Environment, safety, and health annual report, fiscal year 1982, 8:53425 (R;US)

USDOE New Brunswick Lab., Argonne, IL
Evaluation and calibration of a Los Alamos National Laboratory L/sub III/-edge densitometer, 8:54731 (R;US)

USDOE Office of Energy Research, Washington, DC
Standard NIM digital bus (NIM/GPIB), 8:54551 (R;US)

USDOE Office of Energy Research, Washington, DC. Office of Fusion Energy
ECRH-transmission-system workshop, 8:55263 (R;US)
USDOE Office of Energy Research, Washington, DC. Office of Health and Environmental Research
Ecological Research Division Marine Research Program, 8:54951 (R;US)
USDOE Technical Information Center, Oak Ridge, TN
1982 international decommissioning symposium, 8:53988 (R;US)
Energygrams: brief descriptions of energy technology, 8:55343 (R;US)
Utility Applications and Synthetic Fuels and Chemicals Market Sector: workbook, 8:53778 (R;US)
USDOE, Washington, DC
Epidemiology applied to health physics, 8:55003 (R;US)
Ustav Jaderneho Vyzkumu CSKAE, Rez (Czechoslovakia)
Experimental investigation of local hydrodynamic characteristics of the peripheral area of a fast reactor fuel assembly. 2. Results of measurements at rated geometry, 8:53903 (R;CS;In Russian)
Mesh generation for fast reactor fuel assembly in velocity and temperature field calculations using finite element method, 8:53922 (R;CS;In Czech)
Physical properties of uranium hexafluoride. Part A. Phase equilibria, 8:54346 (R;CS)
Study of borate-phosphate system for fixation of nuclear power plant wastes, 8:53682 (R;CS;In Czech)
Utah Geological and Mineral Survey, Salt Lake City (USA)
Bibliography of Utah radioactive occurrences. Volume I, 8:53464 (R;US)
Bibliography of Utah radioactive occurrences. Volume II, 8:53465 (R;US)
Utah State Univ., Logan (USA). Utah Water Research Lab.
Adapting appropriation water law to accommodate equitable consideration of instream flow uses, 8:54959 (R;US)
Utah Univ., Salt Lake City (USA)
Initial study of wild horse and burro demography: determination of pregnancy and lactation rates in various herds. Final report, 8:54908 (R;US)
Utah Univ., Salt Lake City (USA). Dept. of Fuels Engineering
Studies on aged H-Coal catalysts. Final report, 8:53350 (R;US)

V

VEBA A.G., Duesseldorf (Germany, F.R.)
VEBA-report on activities in 1980, 8:55326 (R;DE;In German)
Veterans Administration, Washington, DC (USA)
Computerized tomographic scanners, Veterans Administration, 8:54974 (R;US)
Vienna Univ. (Austria)
Dating of lake sediments by determination of the polonium-210 (lead-210) content, 8:55083 (R;AT;In German)

W

Washington State Univ., Pullman (USA). Air Resources Section
Ambient hydrocarbon and ozone concentrations near a refinery. Final report, 8:54885 (R;US)
Washington Univ., Seattle (USA)
Investigation of small wind-turbine induction generators. Final technical report, September 16, 1980-December 31, 1982, 8:53846 (R;US)
Washington Univ., Seattle (USA). Bioelectromagnetics Research Lab.
Immunological and hematological effects of microwave power transmission from a satellite power system (Part 1 and Part 2). Final report, 8:55073 (R;US)
Weizmann Inst. of Science, Rehovoth (Israel)
Interference effects in the quasimolecularen K-radiation induced in collisions of hydrogen-like ions, 8:55105 (R;DE;In German)
Westinghouse Electric Corp., Pittsburgh, PA (USA)
Testing and verification of granular-bed filters for the removal of particulate and alkalis. Tenth quarterly project report, January 1-March 31, 1983, 8:53385 (R;US)
Westinghouse Electric Corp., Pittsburgh, PA (USA). Research and Development Center
Design of advanced fossil-fuel systems (DAFFS). A study of three developing technologies for coal-fired, base-load electric power generation. Steam-cooled pressurized fluidized-bed power plant, 8:53856 (R;US)
Study of short pulse mercury bromide laser. Final report, 15 March-30 November 1982, 8:54497 (R;US)
Westinghouse Research and Development Center, Pittsburgh, PA (USA)
Design of advanced fossil-fuel systems (DAFFS). A study of three developing technologies for coal-fired, base-load electric power generation. Air-cooled pressurized fluidized-bed power plant, 8:53857 (R;US)
West Virginia Univ., Morgantown (USA)
Development of a pressurized fluidized-bed combustor model, 8:54559 (R;US)
West Virginia Univ., Morgantown (USA). Dept. of Chemical Engineering
Experimental studies on the control of hydrocarbons emission from a gasifier. Final report, September 1981-February 1983, 8:53337 (R;US)
Wisconsin Univ., Madison (USA)
Phytochrome from green plants: assay, purification, and characterization, 8:54963 (R;US)
Wisconsin Univ., Madison (USA). Dept. of Nuclear Engineering
Task II: ECRH and transport modeling in tandem mirrors and divertor physics. Annual progress report on fusion plasma theory, January 1, 1983-December 31, 1983, 8:55241 (R;US)
Wisconsin Univ., Madison (USA). Sea Grant Inst.
Buying a better environment: cost-effective regulation through permit trading. Technical report, 8:54061 (R;US)
Woodward-Clyde Associates, San Francisco, CA (USA)
Overview of the regional geology of the Paradox Basin Study Region, 8:53658 (R;US)
World Health Organization, Geneva (Switzerland)
Elemental composition of human and animal milk. A review. A report prepared under the auspices of the IAEA in collaboration with the WHO, 8:54983 (R;XA)
Wyoming Univ., Laramie (USA)
National Environmental Research Areas: FOCI for integrated research in western energy resource regions. A feasibility study report, 8:53394 (R;US)

Y

Yale Univ., New Haven, CT (USA). Dept. of Physics
Role of d-electrons in chemisorption and metal/support interactions studied by electron spectroscopy. Progress report, January 15, 1983-January 14, 1984, 8:55112 (R;US)
Yale Univ., New Haven, CT (USA). School of Medicine
Algorithm for reconstruction of count-rate curves from total counts, 8:54291 (R;US)

Z

Zentralinstitut fuer Kernforschung, Rossendorf bei Dresden (German Democratic Republic)
10 years Rossendorf Tandem, 8:54624 (R;DD;In German)
Annual report 1981. Nuclear Fuel Research Department, 8:54205 (R;DD;In German)
Joint annual report 1981, 8:55164 (R;DD;In German)

PERSONAL AUTHOR INDEX

Authors' surnames are indexed in the form appearing in the abstracted publication; given names are reduced to initials. Each author entry gives the publication title and the citation number. The document type, e.g., R for Report; country of publication, e.g., US; and language of the document, e.g., In German; are given in parentheses at the end of the entry. If no language statement appears, the language is English. Tables of document types and country of publication codes appear after the indexes. For publications with multiple authors, an entry is provided for each author. Entries for the second and succeeding authors give references to the first author.

Because of problems involved in the mechanical preparation of this index, all accent marks are omitted. Changes in spelling introduced as a result of accent omission follow standard conventions.

A

Aamodt, R.E., Electron orbits in a free electron laser with a longitudinal magnetic wiggler. Technical report, 8:54501 (R;US)

Aas, B., *See* McClelland, J.B., 8:55176

Abassin, J.J., Water radiolysis study: application to the transportation casks, 8:54386 (RA;US)

Abbey, O.B., *See* Sandusky, W.F., 8:53851

Abbott, D.G., *See* Harrison, W.E., 8:53931

Abdou, M.A., *See* Gohar, Y., 8:55262

Abdullah, M.I., Polychlorinated biphenyls in the sediments of the Inner Oslofjord, 8:54947 (J;NL)

Abdushukurov, D.A., *See* Ableev, V.G., 8:55170

Abe, H., Design and fabrication of 100-ton-class spent fuel shipping cask (100-ton cask), 8:54441 (RA;US)
See Maki, Y., 8:54459
See Saegusa, T., 8:53545
See Tasuda, M., 8:54438

Abe, N., *See* Hosokawa, T., 8:54545

Abel, K.H., Residual radioactivity assessment in nuclear power plants: concentrations, distribution inventories, 8:54000 (RA;US)

Ableev, V.G., Inelastic scattering of 8.9 GeV/c deuterons on carbon, 8:55171 (R;SU)
Study of the proton momentum spectrum from deuteron fragmentation at 8.9 GeV/c and an estimate of admixture parameters for the six-quark state in deuteron, 8:55170 (R;SU)

Abraham, M.M., *See* Kopp, O.C., 8:54287

Abraham, S., FASTBUS diagnostic language. Reference manual for the Unibus process interface, Version 1A(15), 8:55334 (R;US)

Abt, S.R., *See* Nelson, J.D., 8:53654

Acevedo, J.H., Renewable energy technologies: models in the energy planning for Puerto Rico, 8:54112 (R;US)

Ackerman, A.D., Massachusetts Home Energy Rating System Project, 8:54143 (R;US)

Ackerman, J.P., *See* Fee, D.C., 8:54117, 8:54120

Ackland, D., HVEM in-situ studies of precipitate coarsening and dissolution in a Pt-C alloy, 8:54226 (RA;US)

Acquavella, J.F., *See* Wilkinson, G.S., 8:55027

Adachi, M., Construction of JRR-3 spent fuel dry storage facility, 8:53592 (BA;XN)

Adams, E.L., Use of recording watt/varmeter to evaluate the electrical power requirements of a combination edger. General technical report (final), 8:54169 (R;US)

Adisoma, G.S., *See* Daemen, J.J.K., 8:53657

Adler, R.J., Extraction and propagation of an intense rotating electron beam, 8:54570 (R;US)

Adolph, H.G., *See* Kamlet, M.J., 8:54794
See Short, J.M., 8:54857

Adolph, J., Magnetic, Moessbauer effect, and neutron small angle scattering measurements on iron clusters in A-zeolites, 8:54214 (R;DE;In German)

Adriano, D.C., Plutonium contents and fluxes in a soybean crop ecosystem near a nuclear fuel chemical separations facility, 8:54931 (J;US)
See Corey, J.C., 8:54929

Agostinelli, A., Vigorous decontamination tests of steel samples, 8:53999 (RA;US)

Aguilar, F., STP: A mathematically and physically consistent library of steam properties, 8:53926 (J;US)

Ahmad, S., *See* Mubarak, M.A., 8:55213

Ahrens, L.A., Neutrino-oscillation experiments at Brookhaven National Laboratory, 8:55127 (R;US)

Akashi, M., Hadronic interactions at energies around 10^3 TeV inferred from the large-scale emulsion chamber experiment at Mt. Fuji, 8:55147 (R;JP)

Akimenko, S.A., Hodoscope shower detector calibration by the $\pi^0(\text{eta}^0) \rightarrow 2\gamma$ decay, 8:54682 (R;SU;In Russian)

Akins, M.J., *See* Koch, D.A., 8:54006

Akiyama, M., *See* Hashikura, H., 8:53976

Akiyama, T., *See* Sekiguchi, N., 8:53902

Akopdzhanov, G.A., Installation for studying pion radiative scattering on nuclei, 8:54683 (R;SU;In Russian)

Aksenov, V.G., *See* Shelaev, I.A., 8:54613

Aksinenko, V.D., Two loop circuit of pulse charoge of forming lines for streamer chamber supply, 8:54699 (R;SU;In Russian)

Akst, I.B., Detonation in intermolecular explosives: characteristics of some eutectic formulations, 8:54826 (RA;US)

Al-Alami, M.Z., Shock-tube study of propane pyrolysis. Rate of initial dissociation from 1400 to 2300 K, 8:54366 (J;US)

Albal, R.S., Oxydesulfurization of coal. Final report, 8:53414 (R;US)
See Joshi, J.B., 8:53416

Albert, R.E., *See* Harley, N.H., 8:55012

Alder, J.C., Classifying decommissioning wastes for allocation to appropriate final repositories, 8:53629 (RA;US)

Aleev, A.N., Hyperon production in nC interactions in the neutron beam with approximately 40 GeV/c momentum, 8:55139 (R;SU;In Russian)

Alejnikov, V.E., Application of the plastic scintillator counter for measuring the high-energy neutron spectra, 8:54700 (R;SU;In Russian)

Alekseev, G.D., Detection of inverse electroproduction of pions on ^{7}Li nuclei, 8:55172 (R;SU;In Russian)

Alemany, L.B., Cross polarization and magic angle sample spinning NMR spectra of model organic compounds. 1. Highly protonated molecules, 8:54334 (J;US)
Cross polarization and magic angle sample spinning NMR spectra of model organic compounds. 2. Molecules of low or remote protonation, 8:54335 (J;US)

Alexander, J.K., *See* Gilbert, T.L., 8:53611

Alexander, V., Pipeline haul-road investigations north of the Brooks Range, 8:54941 (R;US)

Alexiades, V., *See* Wilson, D.G., 8:54248

Alfimenkov, V.P., Parity nonconservation in neutron resonances, 8:55180 (R;SU;In Russian)

Alger, T.D., *See* Alemany, L.B., 8:54334, 8:54335

Alger, T.W., *See* Benett, W.J., 8:54516

Allen, G.C., Packaging test facilities at Sandia National Laboratories, 8:54401 (RA;US)
See Kikuchi, S., 8:53509
See Sutherland, S.H., 8:54427
See Yoshimura, H.R., 8:54443

Allen, J.W., Steam-generating collectors, 8:53815 (R;US)

Allen, P.D., Dissemination of survey meter calibrations, 8:54662 (RA;AU)
Dose contribution due to photonuclear reactions during radiotherapy, 8:54998 (R;AU)
Dose due to photonuclear reactions in tissue during radiotherapy with high energy gamma rays, 8:55001 (RA;AU)

Energy spectra of secondary neutrons produced by high energy bremsstrahlung in carbon, nitrogen, oxygen and tissue, 8:55207 (RA;AU)
Allen, R.E., *See* Buisson, J.P., 8:54286
Allen, R.P., Development of improved technology for decommissioning operations, 8:53620 (RA;US)
Allen, S.L., *See* Simonen, T.C., 8:55247
Allensworth, D.L., Apparatus and method for generating mechanical waves, 8:54480 (P;US)
Alley, S., *See* Ouimette, D.R., 8:55036
Alme, M., *See* Buff, J., 8:55255
Alster, J., *See* Baer, H.W., 8:55177
Alter, U., Comparison of transports expected under different waste management concepts: determination of basic data for application in risk analyses, 8:53469 (RA;US)
Physical security measures for the transportation of specially categorized nuclear material, 8:53717 (RA;US)
Althoff, M., Dsup(*+-) production by e^+e^- annihilation near 34.4 GeV C.M. energy, 8:55136 (R;DE)
Altman, S.M., *See* Harley, N.H., 8:55012
Altmayer, E., *See* Bauman, F., 8:54139
Alvarez, R.A., *See* Byrne, D.P., 8:54553
See Howell, R.H., 8:54630
Amandus, H., Appalachian coal miner mortality study: a 14-year follow-up, 8:53427 (R;US)
Amano, K., *See* Abe, H., 8:54441
Amarouayache, A., Study of a large scale neutron measurement channel, 8:54670 (R;FR;In French)
Amenomori, M., *See* Akashi, M., 8:55147
Amimoto, S.T., Pulsed chemical laser with variable-pulse-length electron-beam initiation and magnetic confinement. Technical report Nov 79-Apr 80, 8:54505 (R;US)
Amrhein, W., Central heat pump units - problems of heat output control, 8:54129 (R;DE;In German)
Amundsen, J.H., *See* Stensaas, J.P., 8:53739
An, S., *See* Hashikura, H., 8:53976
Andersen, J.A., Correlation between measured gas leaks and possible loss of contents from radioactive materials packagings, 8:54409 (RA;US)
Packaging of plutonium and high-enriched uranium safeguards samples for transport, 8:53524 (RA;US)
Quality assurance in packaging design through the peer review process, 8:54456 (RA;US)
Andersen, W.H., Model of impact ignition and explanation of critical shock initiation energy. II. Application, 8:54821 (RA;US)
Anderson, D.W., Thermal and radiative properties of coal-ash deposits. Technical progress report No. 7, June 1, 1983-August 31, 1983, 8:53370 (R;US)
Anderson, K.W., *See* Wilbur, D.S., 8:54333
Anderson, M.S., *See* Swenson, C.A., 8:54275, 8:54276
Anderson, N.G., *See* Taylor, J., 8:54338
Anderson, N.L., *See* Taylor, J., 8:54338
Anderson, R.D., *See* Kooker, D.E., 8:54803
Anderson, R.F., *See* Simpson, H.J., 8:54952
Anderson, R.J., *See* Mendel, C.W. Jr., 8:55297
Ando, J., Nox abatement for stationary sources in Japan. Final report, January 1982-January 1983, 8:54561 (R;US)
SO_2 abatement for coal-fired boilers in Japan. Final report Jun 81-Jan 83, 8:54905 (R;US)
Ando, T., *See* Nishino, S., 8:54541
Andrasi, A., Intercomparison of some environmental monitoring methods applied at nuclear power plants in Czechoslovakia (Bohunice) and in Hungary (Paks), 8:54925 (R;HU)
Andreas, R.D., Wellbore inertial directional surveying system, 8:53436 (P;US)
Andrejko, M.J., *See* Cohen, A.D., 8:53377
Andren, A.W., *See* Stolzenburg, T.R., 8:54891
Andreucci, P., *See* Testemale, G., 8:54377
Andrews, D.C., A. D. C. F. analysis of a Totem based district heating scheme, 8:54189 (R;US)
Andrews, J.W., Hot water tank for use with a combination of solar energy and heat-pump desuperheating, 8:53812 (P;US)
Androsenko, A.A., *See* Androsenko, P.A., 8:53914
Androsenko, P.A., Capabilities of the BRAND program complex for simulating the neutron-physical experiments by the Monte-Calo method, 8:53914 (R;SU;In Russian)
Anklam, T.M., Experimental and analytical investigation of uncovered core heat transfer under high pressure, low heat flux conditions, 8:54041 (J;NL)
Anoshin, A.I., Correlation effects in multiple particle production on nuclei in the cumulative region, 8:55169 (R;SU)
Anspach, W., TN 1300 cask casting process and material qualification, 8:54382 (RA;US)
See Christ, R., 8:53588
See Keese, H., 8:53496
Antal, M.J. Jr., Liquid-fuel research in Hawaii, 8:53768 (RA;US)
Antipov, Yu.M., Investigation of large cylindrical scintillation spectrometer section, 8:54698 (R;SU;In Russian)
See Akopdzhanov, G.A., 8:54683
Aoki, S., Current status of research and development for safe transport of nuclear materials in Japan, 8:53507 (RA;US)
Aplan, F.F., *See* Rey, P.A., 8:53390
Apokin, V.D., *See* Avvakumov, I.A., 8:54680
Appell, H.R., *See* Narain, N.K., 8:53361
Aquaro, D., Analysis of the behavior under impact loads of a shell-type shock absorber for LWR spent fuel transport packaging, 8:54467 (RA;US)
Arai, S., Low velocity linac, 8:54564 (RA;JP)
See Nakanishi, T., 8:54581
Arai, Shigeaki, Noise reduction in the beam current monitor, 8:54610 (R;JP)
Arakawa, H., Effects of potassium promotion on the activity and selectivity of iron Fischer-Tropsch catalysts, 8:54319 (J;US)
Araki, H., Current status on the development of sodium boiling detection system in Japan, 8:53946 (R;JP)
See Kobayashi, K., 8:53947
See Shimazaki, J., 8:53948
Araki, Y., *See* Endo, T., 8:53875
Arbuckle, A.L., *See* Howe, P.M., 8:54866
Archambeau, C.B., *See* Murphy, J.R., 8:54869
Archer, V., *See* Roscoe, R.J., 8:53692
Archer, V.E., *See* Waxweiler, R.J., 8:55031
Aref'ev, V.A., *See* Alcev, A.N., 8:55139
Areti, H., *See* Cox, B., 8:54716, 8:54719
Aries, L., Process for manufacturing a selective absorber for solar panels and selective absorber obtained, 8:53824 (P;FR;In French)
Arioka, K., *See* Onimura, K., 8:54540
Ariyoshi, G.R., Hawaii's energy options for the 80's, 8:54078 (RA;US)
Armstrong, K.M., Evaluation of a processing technique for immobilization of low-level waste, 8:53650 (R;US)
Armstrong, P.J., Evaluation of immediate dismantlement of Candu reactors at the end of service life, 8:54007 (RA;US)
Armstrong, R.W., *See* Elban, W.L., 8:54860
Arnal, T., Design and testing of a plutonium oxide transport container, 8:54395 (RA;US)
Arnold, G.W., Alkali depletion and ion-beam mixing in glasses, 8:54281 (R;US)
Aronson, S.A., *See* Ahrens, L.A., 8:55127
Arrowood, L.F., Transportation data base for the US Department of Energy, 8:53501 (RA;US)
Arter, D.R., Quality assurance as a management tool in decommissioning activities, 8:53630 (RA;US)
Arthur, W.J. III, Radionuclide concentrations in vegetation at a solid radioactive waste-disposal area in southeastern Idaho, 8:54932 (J;US)
Arzumanyan, G.M., *See* Ter-Akopyan, G.M., 8:54761
Aseltine, C.L., *See* Trimble, J.J., 8:54861
Ashmore, J.P., Occupational radiation exposures in Canada - 1979, 8:55040 (R;CA;In English, French)
Askey, J., Influence of residential solar water heaters on electric-utility peak demand, 8:53811 (R;US)
Atac, M., Breakdown processes in wire chambers, prevention and rate capability, 8:54714 (RA;US)
Atia, M.T., *See* El Wakil, S.A., 8:55204
Atkins, D., *See* Hummel, D.J., 8:55330
Atwood, A.I., *See* Boggs, T.L., 8:54804
Aubert, J.J., Muon physics and structure function, 8:55129 (RA;XC)
Auchapt, P., *See* Arnal, T., 8:54395
Audenaerde, K., Summary of work by H.S. Yang and J.B. Beyer, 8:55265 (RA;US)
Audenaerde, K.R., *See* Vernon, R.J., 8:55264
Auerbach, I., *See* Laub, B., 8:54403
Augin, B., *See* Draulans, J., 8:53569
Auguin, B., *See* Hubert, P., 8:53694
Auler, I., *See* Bergemann, L., 8:54001
Aupetit, J., *See* Herberholz, K., 8:53505
Aurich, D., Mechanical requirements for materials of accident proof packagings

of radioactive materials, 8:54380 (RA;US)
Auxier, J.A., Guest editorial: concern over recent use of the ALARA philosophy, 8:55048 (J;GB)
Avakyan, K.M., Characteristics of ionization chambers filled with nitrogen, 8:54677 (R;SU;In Russian)
Averichev, S.A., *See* Shelaev, I.A., 8:54613
Avetisov, L.G., *See* Vasinyuk, I.E., 8:54678
Avetyan, B.A., *See* Vasinyuk, I.E., 8:54678
Aviles, J.B. Jr., *See* Stolovy, A., 8:54791
Avramenko, S.A., *See* Ableev, V.G., 8:55170
Avvakumov, I.A., Apparatus for measuring the polarization in charge-exchange reactions, 8:54680 (R;SU;In Russian)
Ayrault, G., *See* Kohyama, A., 8:54231
Ayres, D.S., Proceedings of the 1982 summer workshop on proton decay experiments, 8:55123 (R;US)
Aziz, A., *See* Perveen, N., 8:54927
Azizbekyan, G.V., *See* Avakyan, K.M., 8:54677
Azizi, A., *See* McClelland, J.B., 8:55176
Azuma, Y., *See* Hongo, T., 8:54473

B

Bastz, H., *See* Ospina, C., 8:53493
Babad, H., Immobilization of radioiodine in synthetic boracite, 8:53688 (P;US)
Bacon, F.M., Low-pressure ion source, 8:55119 (P;US)
Baer, H.W., Study of isovector resonances with pion charge exchange, 8:55177 (J;NL)
Baglio, J.A., Electrochemical characterization of p-type semiconducting tungsten disulfide photocathodes: efficient photoreduction processes at semiconductor/liquid electrolyte interfaces, 8:53784 (J;US)
Bagley, J.M., Adapting appropriation water law to accommodate equitable consideration of instream flow uses, 8:54959 (R;US)
Bahler, S., *See* Ouimette, D.R., 8:55036
Bahr, J., Reversal film development for streamer chamber track photographs, 8:54702 (R;SU)
Bailey, J.M., Modeling and simulation of energy-removal system for superconducting magnets, 8:55261 (R;US)
Bailey, W.A., Explosive equation of state determination by the AWRE method, 8:54835 (RA;US)
Bailey, W.J., Experience with fuel damage caused by abnormal conditions in handling and transport, 8:53868 (RA;US)
Bak, P., Universality and fractal dimension of mode locking structure in systems with competing periodicities, 8:55217 (R;US)
Baker, D.A., Population dose commitments due to radioactive releases from nuclear power plant sites in 1980, 8:53952 (R;US)
Baker, L. Jr., Hydrogen-generating reactions in LWR severe accidents, 8:54019 (R;US)
Baker, N., Hydrogen engine induction technique for backfire-free operation. Contract research report Apr 81-May 82, 8:53738 (R;US)
Baker, R.W., Regional Wind-Energy-Assessment Program. Progress report, October 1981-September 1982, 8:53843 (R;US)
Regional Wind-Energy-Assessment Program. Progress report, October 1981-September 1982. Appendix. Wind statistic summaries, 8:53844 (R;US)
Balandin, V.P., *See* Aleev, A.N., 8:55139
Balcioglu, O., Interaction between ionization and gravity waves in the upper atmosphere, 8:55101 (R;XA)
Baldin, A.M., *See* Anoshin, A.I., 8:55169
Baldwin, D.E., Physics considerations for tandem-mirror magnet design, 8:55314 (R;US)
Status of tandem-mirror confinement, 8:55251 (R;US)
Thermal barriers: their purpose and functioning, 8:55316 (R;US)
Ball, L.A., *See* Beasley, T.M., 8:54954
Ballard, T.D., Development of a device to measure coolant flow within CAGR instrumented fuel stringers, 8:53894 (R;XA)
Ballou, J.E., Toxicology of ^{85}Kr: tissue distribution and retention in the rat, 8:55064 (J;GB)
Balmert, M.E., Development of waste package designs for disposal in a salt repository, 8:53639 (RA;US)
Bamford, R., *See* Cosiol, J., 8:54124
Banerjee, S., Order-disorder transition in Ni_4Mo induced by electron irradiation in a high-voltage microscope, 8:54221 (RA;US)
Bang, A., LASP: Locomotive Analysis Software Package. Software, 8:54154 (R;US)
Banner, M., Search for hadron jets and large transverse momentum electrons at the SPS anti p p collider, 8:55140 (RA;US)
Bannikov, A.V., *See* Akimenko, S.A., 8:54682
Baran, A., Radiation exposure due to railway transport of radioactive materials, 8:53704 (RA;US)
Barancik, J.I., *See* Moskowitz, P.D., 8:53788
Baranyai, A., Analog reactivity meter developed from modules of the instrument system for nuclear industry, 8:53941 (R;HU)
Application of function generator for checking reactivity meter accuracy, 8:53942 (R;HU)
Barbour, I.M., Lattice QCD with light quark masses: Does chiral symmetry get broken spontaneously, 8:55146 (R;DE)
Barclay, J.A., Experiment to determine properties of packed particle beds and regenerators at cryogenic temperatures, 8:54475 (R;US)
Barclay, R.K., *See* King, A., 8:55215
Barco, L., *See* Beruto, D., 8:54308
Bardo, R.D., Role of excited electronic states in the bond-scission process in detonation reactions, 8:54795 (RA;US)
Barette, J., *See* Schuch, R., 8:55105
Barish, B.C., Detector systems, 8:54712 (RA;US)
Barker, C.R., Water jet drilling of long horizontal holes in coal beds, 8:53410 (BA;US)
Barker, J.H., *See* Jaeaeskelaeinen, M., 8:55192
Barker, R.F., 1984 revision of IAEA transport regulations, 8:53478 (RA;US)
Barker, R.J., Decoupling ion efficiency from impedance in pulsed-power diodes, 8:55294 (R;US)
Barkhordar, P.M., Validation of the Cumberland Energyplex concept. Volume 3. Appendixes. Final report, 8:54163 (R;US)
Validation of the Cumberland Energyplex concept. Volumes 1 and 2. Executive summary and analysis detail. Final report, 8:54164 (R;US)
Barnes, M.G., *See* Denahm, D.H., 8:53643
Barnes, R.G., New developments and opportunities for NMR in metal-hydrogen systems, 8:55218 (R;US)
See Lin, M.C., 8:54216
Barr, E.B., *See* Hoover, M.D., 8:53690
See Newton, G.J., 8:53691
Barrera, F., *See* Green, M.A., 8:54477
Barrett, R.E., Examining relationships between coal characteristics and the performance of TVA power plants. Final report, 8:53861 (R;US)
Barrio, J.R., L-[1-^{11}C]leucine: routine synthesis by enzymatic resolution, 8:54348 (J;US)
Barrus, D.M., Thermally actuated thermionic switch, 8:54556 (P;US)
Barsic, N.J., *See* Richards, L.W., 8:54883
Bartelt, J., Results from the Soudan 1 detector, 8:55124 (RA;US)
Barth, E.A., EPA (Environmental Protection Agency) evaluation of the P.A.S.S. kit device under Section 511 of the Motor Vehicle Information and Cost Savings Act. Technical report, 8:54201 (R;US)
Barthelemy, H., Comparison of the various test methods for studying the hydrogen sensitivity of steels used for storage and transport of hydrogen gas. Final report, June 1, 1980-November 30, 1982, 8:54246 (TG;US)
Barthell, B.L., *See* Duchane, D.V., 8:53725
Bartholme, L.G., *See* Shimotake, H., 8:54051
Bartnik, D.L., Effect of ultraviolet and visible radiation on the readout obtained from γ-irradiated and unirradiated $CaSO_4$:Dy in teflon discs, 8:54758 (RA;AU)
Barton, T.P., *See* Landolt, R.R., 8:53685
Basova, B.G., Software for the PROFILE subsystem in the radiation material testing research system for mass measurements of irradiated fuel element geometric dimensions, 8:53967 (R;SU;In Russian)
Basse, W., *See* Neef, R.D., 8:53883
Batarin, V.A., *See* Akopdzhanov, G.A., 8:54683
Battistoni, G., Geiger projection calorimeter, 8:54658 (RA;US)
Baudry, T.V., PAFMOV: a PAFEC to MOVIE.BYU conversion, 8:55284 (R;US)
See Gray, W.H., 8:55286
Bauer, P., *See* Kato, Y., 8:54845

Baughman, R.J., Free-standing polycrystalline boron phosphide film and method for production thereof, 8:54285 (P;US)
Bauman, F., Convective heat transfer in buildings: recent research results. Rev., 8:54139 (R;US)
Baumgartner, F.J., *See* Barrio, J.R., 8:54348
Baxter, B.J., Combined storage for LWR spent fuel and high-level waste, 8:53527 (RA;US)
Bayukov, Yu.D., Deuteron production in proton-nucleus interactions at 7.5 GeV/c, 8:55183 (R;SU;In Russian)
Beach, D.B., Photoelectron spectroscopic study of the bonding in tetracarbonyl(ethylene)iron, 8:54309 (J;US)
Beach, R.L., Development of a flaring burner disposal system. Final report, 8:53438 (R;US)
Beasley, T.M., Plutonium and americium export to the north-east Pacific Ocean by Columbia River runoff, 8:54954 (J;GB)
Beauchamp, J.J., *See* McLean, R.B., 8:53862
Becher, P.F., *See* Finch, C.B., 8:54265
Bechvarzh, F., Search for radiative capture of neutrons in nuclei stimulated by the electric field of a laser wave, 8:55186 (R;SU;In Russian)
Beck, J., *See* Checkoway, H., 8:55008
Beck, R.A.S., *See* Laub, B., 8:54403
Beck, W.L., Radiation dosimetry for epidemiology lung cancer study, 8:55032 (RA;US)
See Cookfair, D.L., 8:55029
See Hudson, D.H., 8:55018
See Strom, D.J., 8:55020
Becker, J.C. Jr., Integrated liquid-fuel production, 8:53769 (RA;US)
Becker, K., International ISO standards on packaging and transport of radioactive materials, 8:53572 (RA;US)
Beckstead, M.W., *See* Butcher, A.G., 8:54799
Bedate, C.A., Genetic engineering in biotechnology, 8:53781 (R;US)
Bedjidian, M., *See* Chamcham, K., 8:55193
Beebe, G.W., Methodologic assessment of radiation epidemiology studies, 8:55006 (RA;US)
Beene, J.R., *See* Jaeneskelaeinen, M., 8:55192
Beevers, H., Respiration of roots. Response to low O_2 stress. Final report, 8:54981 (R;US)
Begichev, S.N., Calculating the thermal neutron fields in polycells with "black" blocks using the one-velocity p3-approximation and Monte-Carlo method, 8:53965 (R;SU;In Russian)
Begun, G.M., *See* Madic, C., 8:54350
Behrendt, V., Goal system for comparative assessments of nuclear fuel transport under security aspects, 8:53716 (RA;US)
Behroozi, F., *See* Shenoy, G.K., 8:54288
Beier, E.W., Design study for a fine-grained multi-kiloton detector for nucleon decay and neutrino studies, 8:54648 (RA;US)
Belanova, T.S., Analysis of americium and curium resonance parameters, 8:55196 (R;SU;In Russian)
Belcher, R.A., *See* Bailey, W.A., 8:54835
Belefski, M.L., Development document for effluent limitations guidelines and standards for the battery manufacturing point source category, 8:54958 (R;US)
Belikov, N.I., *See* Avvakumov, I.A., 8:54680
Bell, A.T., *See* Arakawa, H., 8:54319
Beller, M., Chemical/hydrogen energy systems multi-year R and D plan, 8:53734 (R;US)
Belli, P., Acceleration experiments at low power density, 8:55293 (R;IT)
Bellman, R.A., *See* McPherson, M.J., 8:54777
Belousov, V.I., *See* Akimenko, S.A., 8:54682
Belova, N.K., Unit of high-speed decimal scaler with computer indication and control, 8:54691 (R;SU;In Russian)
Ben Hadid, H., *See* Amarouayache, A., 8:54670
Benedick, W.B., *See* Lee, J.H.S., 8:54036
Benett, W.J., Inductive gas line for pulsed lasers, 8:54516 (P;US)
Benjamin, S.A., *See* Reif, J.S., 8:55034
Benjamin, T.M., Microprobe analyses of rare-earth-element fractionation in meteoritic minerals, 8:55094 (R;US)
Bennett, B.I., National Performance Audit Program. Ambient air audits of analytical proficiency, 1981, 8:54904 (R;US)
Bennett, C.R., Canadian approach to decommissioning, 8:54008 (RA;US)
Bennett, E.F., *See* Cox, S.A., 8:54750
Bennett, L.H., *See* Watson, R.E., 8:54251
Bennett, R.H., Piezometer-probe technology for geotechnical investigations in coastal and deep-ocean environments, 8:54769 (R;US)
Benninghofen, G., Core-adjacent instrumentation systems for pebble bed reactors for process heat application - state of planning, 8:53886 (R;XA)
Beno, M.A., *See* Schultz, A.J., 8:54318
Berard, M.F., *See* Jordan, G.W., 8:54256
Bergemann, L., Neutron activation of reactor pressure vessel and biological shield of the decommissioned Gundremmingen Unit A Nuclear Power Station, 8:54001 (RA;US)
Berger, C.D., α-β-γ spectrometer for directing decontamination of soils, 8:54747 (J;GB)
Berger, J.D., *See* Hussey, M.W., 8:54420
See Shirley, C.G., 8:54405
See Yount, J.A., 8:53713
Bergman, R.G., *See* Janowicz, A.H., 8:54326
Bergstrom, K.A., Preliminary interpretation of the tectonic stability of the reference repository location, Cold Creek syncline, Hanford Site, 8:53680 (R;US)
Berlinrut, D.D., *See* Rice, R.W., 8:53443
Bernabee, R.P., Rapid method for the determination of americium-curium, plutonium and thorium in biological and environmental samples, 8:54349 (J;GB)
Bernard, H., *See* Lazarevitch, S., 8:54454
Bernard, R.D., *See* Tansley, R.S., 8:54373
See Zaccor, J.V., 8:55347
Bernardo, B.C., IAEA coordinated research programme on safe transport of radioactive materials, 8:53508 (RA;US)
Bernatowicz, H., Parametric effects on nondestructive-assay techniques. Final report, 8:53719 (R;US)
Berseecker, R.R., Deflagration-to-detonation transition studies of porous explosive charges in plastic tubes, 8:54797 (RA;US)
See Sandusky, H.W., 8:54851
Bernhardt, D.E., Characterization of nuclear fuel cycle facilities requiring decommissioning and decontamination, 8:53632 (RA;US)
Bernhardt, G.P. IV, Electron scattering from silicon 30. Master's thesis, 8:54269 (R;US)
Bernstein, J.D., *See* Olson, J.M., 8:53736
Berry, H.G., 100% alignment of hydrogen excited states in beam-foil spectroscopy, 8:55108 (R;US)
Berry, W.E., Durability of marker materials for nuclear waste isolation sites, 8:53670 (R;US)
Bertram, K.M., Inland-transport modes for coal and coal-derived energy: an evaluation method for comparing environmental impacts, 8:53411 (R;US)
Beruto, D., Effect of lithium carbonate on the reaction of CaO powders with CO_2, 8:54308 (R;US)
Bethea, R., Public Utility Regulatory Policies Act of 1978 (PURPA) and the State of Hawaii Public Utilities Commission (PUC) regulations, 8:54086 (RA;US)
Beyer, J.B., *See* Vernon, R.J., 8:55264
Beynel, P., Compilation of radiation damage test data. Pt. 3. Materials used around high-energy accelerators, 8:54272 (R;XC;In English, French)
Beznogikh, Yu.D., Dubna synchrophasotron. Operation and improvement (quarter 4, 1981), 8:54611 (R;SU;In Russian)
Biaggio, A.L., Acceptability criterion applicable to accidental cases in the transport of radioactive materials, 8:53492 (RA;US)
Bibb, A.E., *See* Steeves, A.F., 8:54544
Bickel, D.C., *See* Allen, G.C., 8:54401
Bieg, K.W., *See* Sweeney, M.A., 8:55296
Bienayme, J., Remarks on the differences that distinguish the interpolation of Cauchy from the least-squares method and which assure the priority of this method, 8:55232 (TJ;US)
Bierbaum, P.J., *See* Rinsky, R.A., 8:55010
Bierman, S.R., Criticality experiment program in support of nuclear materials transportation systems, 8:53563 (RA;US)
Billings, R.B., Price, socioeconomic, and climatic influences on residential water use in southern arizona. Completion report, October 1980-September 1981, 8:54068 (R;US)
Bilokon, H., *See* Battistoni, G., 8:54658
Bird, E.J., *See* Bridle, D.A., 8:54455
Birkhoff, R.D., *See* Painter, L.R., 8:55114
Bishop, D.J., *See* Harrison, F.L., 8:53393
Bishop, R.W., Need to increase public awareness of the safety of radioactive materials transport, 8:53532 (RA;US)

Bitter, M., Dielectronic satellite spectra of hydrogen-like titanium (Ti XXII), 8:55246 (R;US)
Bitzan, E.F., *See* Farnum, B.W., 8:53381
Biwer, T.L., *See* DeLuca, W.H., 8:54046
Bixler, H.A., *See* Spencer, D.J., 8:54492
Black, A.D., *See* DeLafoese, P.H., 8:53836
Blakesley, B.A., *See* Beasley, T.M., 8:54954
Blalock, L.G., Department of Energy: Transportation Operations and Management System, 8:53517 (RA;US)
Radioactive material transportation: the large quantity problem, 8:53513 (RA;US)
Radioactive material information program, 8:53575 (RA;US)
See Joy, D.S., 8:53528
See Reed, H.C., 8:53574
See Rymer, A.C., 8:53710
See Taynton, L.F., 8:53551
Blanchard, R.J., *See* Abassin, J.J., 8:54386
Blanchard, W., Energy-conservation programs: Kauai County, 8:54177 (RA;US)
Bleszynski, E., *See* McClelland, J.B., 8:55176
Bleszynski, M., *See* McClelland, J.B., 8:55176
Blik, A.M., *See* Akimenko, S.A., 8:54682
Blink, J.A., Disposal of activated fusion wall materials, 8:53727 (R;US)
Lithium equation-of-state, 8:54240 (R;US)
Blokhintseva, T.D., *See* Alekseev, G.D., 8:55172
Blommer, E.J., *See* Jensen, R.C., 8:54810
Blonder, G.E., I-V curves of superconducting microconstrictions. Technical report, 8:55219 (R;US)
Bloomberg, D.J., *See* Reed, H.C., 8:53574
Bloomquist, C.A.A., *See* Dyrkacz, G.R., 8:53374
Bloomquist, D.D., Thermocouple temperature measurements in shock initiated PBX-9404, 8:54862 (RA;US)
Blum, P., *See* Kirchner, B., 8:54387
Blythe, R.A., Study of the influence of target material on impact damage, 8:54425 (RA;US)
Boardman, E.C., *See* Venkata, S.S., 8:53846
Bodner, G.S., *See* Kiel, W.A., 8:54323
Boercker, D.B., *See* Cauble, R., 8:55235
Boeuf, A., Small angle neutron scattering study of the damage induced by creep deformation in AISI 304 stainless steel, 8:54238 (R;US)
Bogdanov, D.D., *See* Ter-Akopyan, G.M., 8:54761
Bogdzel', A.A., Method of summation of amplitudes of coinciding pulses from Ge(Li) detectors used to study cascades of gamma-transitions in (n,γ) reaction, 8:54705 (R;SU;In Russian)
Boggs, T.L., Role of gas phase reactions in deflagration-to-detonation transition, 8:54804 (RA;US)
Bohac, C.E., Techniques for reaeration of hydropower releases. Final report Oct 80-Apr 82, 8:53756 (R;US)
Bohm, B., *See* Freund, H.U., 8:53998
Bohn, M.P., Seismic Safety Margins Research Programs. Assessment of potential increases in risk due to degradation of steam generator and reactor coolant pump supports, 8:54032 (R;US)
Bohnstedt, C.F., *See* Carlisle, C.T., 8:53432
Boisard, F., Raman scattering temperature measurement behind a shock wave, 8:54863 (RA;US)
Bokelmann, R.F., Economical dry storage of large amounts of spent fuel and vitrified high level radioactive waste, 8:53599 (BA;XN)
Bole, J.B., *See* Papanicolaou, E., 8:54988
Bolosna, G., *See* Battistoni, G., 8:54658
Bolton, R., *See* Baer, H.W., 8:55177
Bomar, F., *See* Cosiol, J., 8:54124
Bomko, V.A., Development and investigation of electromagnetic characteristics for modifications of accelerating structure of heavy ion linear accelerator, 8:54565 (R;SU;In Russian)
Bond, P.D., *See* Hansen, O., 8:55181
Bond, R.D., Contamination studies on pond-loaded casks, 8:53711 (RA;US)
Bondarenko, V.V., Reactivity meter for collective use on the base of the Electronica-100I computer, 8:53928 (R;SU;In Russian)
Bondietti, E.A., *See* Lee, S.Y., 8:55063
Boni, A.L., *See* Adriano, D.C., 8:54931
See Corey, J.C., 8:54929
Bonino, R., *See* Chauvat, P., 8:54713
Bonk, G.J., Effects of future energy scenarios on photovoltaic energy value, 8:53761 (R;US)
Bonnard, J.C., *See* Duret, B., 8:54415
Bonnet, M., Introduction to numerical analysis, 8:55328 (R;FR;In French)
Bonniaud, R., Vitrification processes for fission product solutions, 8:53605 (R;FR;In French)
Bonnyman, J., Effect of milking efficiency on Tc-99 content of Tc-99m derived from Tc-99m generators, 8:54344 (RA;AU)
Bonthoux, F., Diverging detonations in RDX and PETN based cast-cured PBX, 8:54818 (RA;US)
Book, S.A., Iodine-129 uptake and effects of lifetime feeding in rats, 8:55057 (J;GB)
Boon, J.J., The analytical pyrolysis of particulate residues of decomposing Myriophyllum heterophyllum, 8:54937 (J;NL)
Boone, L.R., *See* Liou, R.S., 8:55051
Booth, W.B., *See* Potter, I.N., 8:53807
Bopp, W.B., DRAMIN: transferring data from the Applicon graphic system to a DRAM input file. User guide, 8:55339 (R;US)
Borchardt, J.A., *See* Kang, S.J., 8:55068
Bordzilovsky, S.A., *See* Titov, V.M., 8:54816
Borgonovi, G., *See* Bernatowicz, H., 8:53719
Boris, J.P., *See* Sheeley, N.R. Jr, 8:55088
Borisov, A.A., *See* Khasainov, B.A., 8:54820
Born, G.S., *See* Landolt, R.R., 8:53685
Borzakov, S.B., *See* Alfimenkov, V.P., 8:55180
Bosch, R.G., *See* Stephens, H.P., 8:53360
Bostwick, L.E., Engineering-support services for the DOE/GRI coal-gasification research program. Monthly technical progress report, 27 February-26 March 1982, 8:53335 (R;US)
Bouriannes, R., *See* Kato, Y., 8:54845
Bouvet, P.E., Biomass-energy development in the sugar industry, 8:53765 (RA;US)
Bovet, C., Cedar counters for particle identification in the SPS secondary beams: A description and an operation manual, 8:54672 (R;XC)
Bowman, J.D., *See* Baer, H.W., 8:55177
Bowman, J.E., *See* Stevens, C.G., 8:54341
Box, W.D., *See* Shappert, L.B., 8:54402
Boyarinov, V.F., Program for neutron group calculation of a plane periodical reactor cell using the difference analog of the surface pseudosource method NEGR-PR, 8:53917 (R;SU;In Russian)
Boyce, L., *See* Schwartz, M.W., 8:54383
Boyd, J.W., *See* Bohac, C.E., 8:53756
Boyle, V.M., Shock ignition sensitivity of multiply-shocked pressed TNT, 8:54854 (RA;US)
Boyles, C., *See* Petsonk, L., 8:54975
Bozec, C., *See* Testemale, G., 8:54377
Bozoki, E.S., Problem of magnet ramping, 8:54634 (R;US)
Brackbill, R., *See* Wilkinson, G.S., 8:55027
Bradley, D.J., Thermodynamics of carbon in Ni-C alloys from 900 to 1215°C, 8:54247 (J;US)
Brady, F.J., Mathematical model for the doubly fed wound-rotor generator, 8:53847 (R;US)
Bradymire, S.L., *See* Sandusky, W.F., 8:53851
Brager, H.R., Swelling of high-nickel Fe-Ni-Cr alloys in EBR-II (Contribution to DAFS quarterly), 8:53929 (R;US)
Brailsford, J.R., Calculations of the temperature rise of overhead distribution connectors, 8:53865 (R;US)
Guidelines for assessing overview line connectors using infra-red thermovision, 8:53864 (R;US)
Brainard, J.P., *See* Bacon, F.M., 8:55119
Branagan, E.F., *See* Willis, C.A, 8:55019
Brandenburg, J.E., *See* Sweeney, M.A., 8:55296
Brau, C.A., *See* Warren, R.W., 8:54511, 8:54513
Brau, J.E., *See* Cox, B., 8:54719
Braunschweig, W., *See* Althoff, M., 8:55136
Bregani, F., *See* Agostinelli, A., 8:53999
Brice, J.C., Stability of relocated stream channels. Final report, January 1978-December 1980, 8:54956 (R;US)
Bridle, D.A., Hands-off technique for the internal decontamination of fuel transport flasks, 8:54455 (RA;US)
Brimhall, J.L., Comparison of the effect of electron and ion irradiation on crystallization of amorphous alloys, 8:54235 (RA;US)
Brinkman, W.H., *See* Goldmann, K., 8:53568
Brinkmann, H.U., Operating experience with two transport storage casks for surface storage of spent HTGR fuel elements, 8:53529 (RA;US)
Brittain, R.D., *See* Wood, B.J., 8:53356
Britton, M.W., Conoco's tar sands development in south Texas, 8:53459 (RA;US)
Brixy, H., *See* Benninghofen, G., 8:53886

Broadbent, E.W., Hydroelectric development in Hawaii, 8:53752 (RA;US)
Brochet, C., *See* Kato, Y., 8:54845
See Presles, H.N., 8:54829
Brockmann, R., *See* Renfordt, R.E., 8:55194
Brogan, D.K., *See* Sawyer, S.G., 8:53426
Brookhart, M., *See* Schultz, A.J., 8:54318
Brooks, G.B., Gas centrifuge enrichment plant: a future transportation challenge, 8:53470 (RA;US)
Brooks, J.N., Self-pumping impurity by in-situ metal deposition, 8:55281 (R;US)
Brooks, P.P., *See* Heitner, K.L., 8:54075
Brosche, D., *See* Essmann, J., 8:54003
Brosse, J.M., Laboratory scale sensitivity testing of insensitive high explosives, 8:54858 (RA;US)
Brosset, C., Total airborne mercury and its possible origin, 8:54890 (J;NL)
Brown, B., *See* Jensen, R.C., 8:54810
Brown, B.S., *See* Hahn, P., 8:55282
Brown, D.P., Water resources of Manatee County, Florida. Water-resources investigations, 8:54069 (R;US)
See Schlafke, A.P., 8:54376
See Wu, K.C., 8:54375
Brown, G., *See* Stitt, S.C., 8:53753
Brown, L.F., Using diffusion measurements to determine pore-size distributions in porous materials, 8:54528 (J;GB)
Brown, O.F. II., Recent development in the area of insurance and indemnity coverage for transportation of radioactive materials in the United States, 8:53533 (RA;US)
Brown, S.F., *See* Price, W.E., 8:54759, 8:54760
Brubaker, R.C., *See* Pardini, J.A., 8:53905
Brugger, R.P., *See* Peter, K.G., 8:54398
Bruins, R.J.F., *See* Erdreich, L.S., 8:55071
Brummer, J.G., *See* Wilkinson, F., 8:54343
Bruno, I., *See* Belli, P., 8:55293
Bryant, L.E. Jr., High-speed videography combined with an x-ray image intensifier for dynamic radiography, 8:54538 (R;US)
Survey of flash x-ray techniques and applications, 8:54539 (R;US)
Bryselbout, J., *See* Barthelemy, H., 8:54246
Bryukhanov, N.S., Particle dosing for a bubble chamber in the microsecond time range of beam extraction, 8:54684 (R;SU;In Russian)
Bucholz, J.A., Conceptual design of large spent fuel shipping casks for older PWR fuel, 8:54432 (RA;US)
Buck, J.W., *See* Sandusky, W.F., 8:53851
Buck, O., *See* Ranjan, R., 8:54215
See Thompson, R.B., 8:54537
Buckley, D.W., *See* Rosen, L.C., 8:54037
Buckman, A., *See* Kuhna, S.J., 8:53521
Buckmaster, J.D., Lectures on mathematical combustion. Lecture 1. Pre-asymptotic combustion revisited. Interim technical report, 8:54351 (R;US)
Lectures on mathematical combustion. Lecture 2. Governing equations, asymptotics, and deflagrations. Interim technical report, 8:54352 (R;US)
Lectures on mathematical combustion. Lecture 3. General deflagrations. Interim technical report, 8:54353 (R;US)
Lectures on mathematical combustion. Lecture 4. SVFS and NEFS. Interim technical report, 8:54354 (R;US)
Lectures on mathematical combustion. Lecture 5. Stability of the plane deflagration wave. Interim technical report, 8:54355 (R;US)
Lectures on mathematical combustion. Lecture 6. Cellular flames. Interim technical report, 8:54356 (R;US)
Lectures on mathematical combustion. Lecture 7. Pulsating flames. Interim technical report, 8:54357 (R;US)
Lectures on mathematical combustion. Lecture 8. Counterflow diffusion flames. Interim technical report, 8:54358 (R;US)
Lectures on mathematical combustion. Lecture 9. Spherical diffusion flames. Interim technical report, 8:54359 (R;US)
Lectures on mathematical combustion. Lecture 10. Free-boundary problems. Interim technical report, 8:54360 (R;US)
Buclin,, J.P., Decommissioning of Lucens, 8:53994 (RA;US)
Budaeus, A., *See* Wieser, K.E., 8:54457
Budd, J., *See* Goodings, A., 8:53882
Budden, M., *See* Trujillo, A.A., 8:54451
Budinger, T.F., *See* Derenzo, S.E., 8:54752
Buechley, R.W., *See* Samet, J.M., 8:55033
Buff, J., Thermonuclear burn in cylindrical targets. Final report, 8:55255 (R;US)
Buhks, E., *See* Guarr, T., 8:54310
Buisson, J.P., Electronic states of (2 x 1) and (1 x 1) (111) surfaces of Ge, Si diamond, GaAs and Ge on Si, 8:54286 (J;NL)
Buldakovskij, V.N., *See* Beznogikh, Yu.D., 8:54611
Burch, R.E., *See* Mihalka, A.M., 8:54554
Burford, R.P., Fracture toughness of polybutadiene at cryogenic temperatures. Technical report, 8:54266 (R;US)
Burger, T.N., *See* Ramsey, W.E., 8:53541
Burgess, M.H., Thermal trials on a water-cooled LWR flask, 8:54416 (RA;US)
Burgy, D., Task analysis of nuclear-power-plant control-room crews: project approach methodology, 8:53944 (R;US)
Task analysis of nuclear-power-plant control-room crews, 8:53945 (R;US)
Burian, R.J., Experimental determination of radionuclide release and transport from spent fuel exposed to cask fire environments, 8:53705 (RA;US)
Burkes, J.P., Petrographic examination of Bell Canyon Tests (BCT) 1-FF field grouts over a three-year period, 8:53645 (R;US)
Burnay, S.G., Preliminary assessment of polymer-modified cements for use in immobilisation of intermediate level radioactive waste, 8:53602 (R;GB)
Burnet, G., Mineral recovery from coal-conversion solid wastes, 8:53387 (R;US)
Burnett, D.S., *See* Benjamin, T.M., 8:55094
Burnett, P., Use of chromel-alumel thermocouples in high temperature experiments in WAGR, 8:53879 (R;XA)
See Gentry, P.J., 8:53930
Burns, E.J.T., Diagnosing the ion beam on the Applied-B diode, 8:55300 (R;US)
See Dreike, P.L., 8:55299
See Montry, G.R., 8:55301
Burns, F.B., *See* Leisher, W.B., 8:54413
Burns, J.T., *See* Bennett, R.H., 8:54769
Burns, P.A., Efficiency calibration of low energy photon spectrometers, 8:54665 (RA;AU)
See Moroney, J.R., 8:55210
Burr, J.R., Determination of baseline levels of toxic nonradioactive substances at the ICPP, 8:53648 (R;US)
Burrows, T.W., *See* Peelle, R.W., 8:55160
Burton, J.T.A., Detonation temperature of some liquid explosives, 8:54844 (RA;US)
Bushnell, R.C., *See* Pearsall, E.S., 8:55345
Bushnin, Yu.B., Electronic read-out system for the drift chambers of a neutrino calorimeter, 8:54679 (R;SU;In Russian)
Slaw extracted proton beam formation and monitoring for the "QUARTZ" setup, 8:54579 (R;SU;In Russian)
Butcher, A.G., Effects of igniter and compaction on DDT run up in plastic pipes, 8:54799 (RA;US)
Butcher, T., *See* Sapienza, R.S., 8:53412
Butler, E.P., *See* Waiting, J.F., 8:54224
Butler, J., *See* Cumalat, J., 8:55137
Byalko, A.A., Data compression methods in problems of experimental nuclear physics, 8:55115 (R;SU;In Russian)
Bychkov, V.M., Evaluation of the (n,2n) and (n,3n) cross-sections for heavy nuclei with allowance for non-equilibrium processes, 8:55199 (R;XA)
Bykovski, Yu.A., *See* Ter-Akopyan, G.M., 8:54761
Byrne, D.P., Air-breakdown limits for microwave-pulse propagation. Part I. Experiments, 8:54553 (R;US)
Bystritskij, V.M., Event selection in the experiments on studying μ-atomic and mesic molecular processes, 8:54696 (R;SU;In Russian)

C

Cable, T.L., *See* Massoth, F.E., 8:53350
Cacuci, D.G., Eigenvalue-dependent neutron energy spectra: Definitions, analyses, and applications, 8:53924 (J;US)
Particle and radiation leakage importance: definition, analysis, and interpretation, 8:53925 (J;US)
Cadoz, J.L., *See* Phillips, D.S., 8:54264
Caggiano, J.A., *See* Bergstrom, K.A., 8:53680
Cagnon, R., Criticality control of packagings loaded with nuclear spent fuel, 8:53562 (RA;US)
Cahn, R.N., Cross section estimates for multi-TeV physics, 8:55151 (RA;US)
Cahoon, J.L., *See* Derenzo, S.E., 8:54752
Calabrese, G.S., Photoassisted reduction of sulfur dioxide in nonaqueous solutions at p-type semiconductor electrodes, 8:54313 (J;US)

See Bagilo, J.A., 8:53784
Calderon, M.O., Vacuum measurements on the Tandem Mirror Experiment Upgrade (TMX-U) fusion experiment, 8:55311 (R;US)
Caldwell, J.T., Method for monitoring irradiated nuclear fuel using cerenkov radiation, 8:53475 (P;US)
Calkins, G.D., Status of decommissioning program of US Nuclear Regulatory Commission, 8:53608 (RA;US)
Calkins, N.C., Ultrasonic-impact grinder system, 8:54481 (P;US)
Callahan, J.M., *See* Jackson, D.R., 8:53804
Callas, J., *See* Ahrens, L.A., 8:55127
Calo, J.M., *See* Sy, O., 8:53355
Calvert, J.G., Mechanism and rates of the gas phase oxidations of sulfur dioxide and the nitrogen oxides in the atmosphere, 8:54887 (R;US)
Calvert, R.L., *See* Bartnik, D.L., 8:54758
Campbell, D., *See* Sondericker, J.H., 8:54374
Campbell, D.K., Aquaculture report 1976, 8:53839 (R;US)
Campbell, E.M., *See* Rosen, M.D., 8:55315
Campbell, J., Study and evaluation of the latent cooling potential of chemical de-humidifiers. Final report, 8:53803 (R;US)
Campbell, M.M., *See* Hughes, T.P., 8:54572
Cane, G., *See* Cuzzaniti, M., 8:53585
Canonico, D.A., *See* Goldmann, K., 8:53568
Cantrell, B.K., *See* Richards, L.W., 8:54883
Caporaso, G.J., *See* Paul, A.C., 8:54594
Carden, H.F., *See* Treaftis, H.N., 8:55076
Carlisle, C.T., Development of an improved method for the analysis of pressure-core samples. Final report, 8:53432 (R;US)
Carlone, C., *See* Shanks, H.R., 8:54274, 8:54277
Carlson, C.L., *See* Sendlein, L.V.A., 8:53400
Carlson, D.E., *See* Neef, R.D., 8:53883
Carlson, K.A., Beyond the Association of American Railroads and Department of Energy workshop in 1981, 8:53539 (RA;US)
See Kikuchi, S., 8:53509
Carnes, B.A., Estimation of the ridge constant: an approach based on the condition index, 8:55333 (R;US)
Carney, M., *See* Bennett, C.R., 8:54008
Carpenter, R.W., *See* Hackney, S.A., 8:54223
Carper, W.R., *See* Pugh, H.L., 8:54793
Carr, D.B., Weighted nonparametric tail estimation procedures, 8:55227 (R;US)
Carrick, I.H., *See* Harrison, W.E., 8:53931
Carricker, A.W., *See* Wingert, V., 8:53706
Carter, J.G., Electron-drift velocity and ionization and attachment coefficients in gases/mixtures for diffuse-discharge opening switches, 8:54550 (R;US)
Caruso, A., *See* Belli, P., 8:55293
Cashwell, J.W., Cost model for the transportation of nuclear wastes, 8:53556 (RA;US)
See Cole, B.M., 8:53557
See Joy, D.S., 8:53528
See Peterson, R.W., 8:53555
See Schneringer, P.E., 8:54445
See Wilmot, E.L., 8:53487
Caskey, G.R. Jr., Helium damage in austenitic stainless steels, 8:54210 (R;US)
Casper, T.A., *See* Simonen, T.C., 8:55247
Caspi, S., Heat transfer to subcooled He I, 8:54522 (R;US)
Cassanova, R., *See* Delanny, F., 8:53358
Cassidy, D.A., *See* Groh, E.F., 8:53934
Cataldo, D.A., *See* Garland, T.R., 8:54928
Cauble, R., Charge-charge correlation functions in ultra dense plasmas. Memorandum report, 8:55235 (R;US)
Caushy, A., Dissertation in interpolation, 8:55231 (TJ;US)
Cerioni, I., *See* Belli, P., 8:55293
Cervenka, J., *See* Hejna, J., 8:53903
Chaisse, F., Elementary solution for the equations of the zeroth order internal structure of a strong detonation in a solid high explosive, 8:54836 (RA;US)
See Cheret, R., 8:54831
Chaiyasut, N., *See* Leenanupan, V., 8:54298
Chajka, Yu.V., *See* Bondarenko, V.V., 8:53928
Chalfant, G.G., Upgrading the DOT 6M-2R shipping package, 8:54435 (RA;US)
Chamcham, K., One - and non-coplanar two - particle inclusive cross-sections from the ^{4}He + Pb reaction at 150 MeV/nucleon, 8:55193 (RA;FR)
Chan, S.K., Theory to predict the velocity-diameter relation of explosives, 8:54830 (RA;US)
Chang, C.Y., TOF for heavy stable particle identification, 8:54722 (RA;US)
Chang, J., *See* Burns, E.J.T., 8:55300
Chang, L.M., *See* Hershkowitz, J., 8:54802
Chang, T.S., *See* Donatelli, D.E., 8:55099
Channell, J.K., *See* Neill, R.H., 8:53580
Chao, A.W., Alternative longitudinal polarization scheme for tristan, 8:54643 (R;JP)
Coherent instabilities of a relativistic bunched beam, 8:54593 (R;US)
Transverse quadrupole wake field effects in high intensity linacs, 8:54627 (J;GB)
Chapman, G.A., Hawaii Deep-Water Cable Program: electrical-grid-system integration investigations, 8:54093 (RA;US)
Charles, R.W., Temperature calibration of a new rapid quench vessel, 8:55082 (J;US)
Chatterjee, A.K., *See* Barkhordar, P.M., 8:54164
Chatterjee, S., *See* Ghassib, H.B., 8:55121
Chaudhri, M.A., *See* Allen, P.D., 8:54998, 8:55207
Chaudhri, M.M., *See* Hagan, J.T., 8:54841
Chaudri, M.A., *See* Allen, P.D., 8:55001
Chauvat, P., Performance of a 16000 wire Mini-Drift MWPC system, 8:54713 (RA;US)
Checkoway, H., Mortality among workers at the Oak Ridge National Laboratory, 8:55008 (RA;US)
Chen, H.H., Search for proton decay and solar neutrinos with a liquid TPC, 8:54652 (RA;US)
Chen, J.C., *See* Ginsberg, T., 8:53986
Chen, J.T., Kinetics and mechanism of the oxidation of hexaaquovanadium(II) ions by aliphatic radicals, 8:54314 (J;US)
Chen, P.J., *See* Allensworth, D.L., 8:54480
Chen, W., Minimum-thickness low-activation toroidal field coil concept for tokamak reactors, 8:55290 (R;US)
Cheng, E.T., Nuclear design of a very-low-activation fusion reactor, 8:55289 (R;US)
See Chen, W., 8:55290
See Hopkins, G.R., 8:55291
Cheng, L.J., *See* Young, R.T., 8:53764
Cheng, S.S., Treatment of phenol with an innovative fluidized bed activated carbon anaerobic filter, 8:54940 (R;US)
Cheresh, M.H., *See* Vigil, M.G., 8:54389
Cheret, R., Some results on the converging spherical detonation in a solid explosive, 8:54831 (RA;US)
See Chaisse, F., 8:54836
Chernin, D., Mode coupling in the modified betatron. Memorandum report, 8:54568 (R;US)
Chernoch, J.P., *See* Liu, Y.S., 8:54496
Cherry, M.L., Homestake tracking spectrometer: a one-mile deep 1400-ton liquid scintillation nucleon decay detector, 8:54647 (RA;US)
Other physics experiments at the Homestake Mine, 8:54653 (RA;US)
Cherville, J., *See* Delpuech, A., 8:54792
Chess, E.K., *See* Wilson, B.W., 8:53428
Chevalier, G., Justification and advantages of crushing tests compared with fall tests and the modification of existing regulations, 8:54392 (RA;US)
Chevalier, P., Solar energy collector, 8:53822 (P;FR;In French)
Chian, E.S.K., *See* Cheng, S.S., 8:54940
Chiba, F., *See* Laub, B., 8:54403
Chick, M.C., Mechanism of initiation of composition B by A metal jet, 8:54815 (RA;US)
Chida, K., Operating status of TARN vacuum system and future tasks, 8:54642 (RA;JP;In Japanese)
Chikazumi, S., *See* Iizumi, M., 8:54263
Chilvers, D.K., *See* Bailey, W.A., 8:54835
Chin, Y., Calculation on longitudinal instability due to RF cavities, 8:54618 (R;JP)
Chiogioji, M.H., Federal conservation programs in the 80's, 8:54076 (RA;US)
Chirat, R., Detonation properties of condensed explosives calculated with an equation of state based on intermolecular potentials, 8:54838 (RA;US)
Chiu, M.C., Fuel ignition by high voltage capacitive discharges, 8:53863 (R;US)
Chivers, T.C., Factors influencing the design and assessment of elastomer seals for nuclear fuel transport flasks, 8:54411 (RA;US)
Choi, C., Influences of macerals on the hydrogen-deuterium exchange reaction between tetralin and diphenylmethane, 8:53379 (J;US)
Choppin, G.R., *See* Rizkalla, E.N., 8:54332
Chou, C., Immunological and hematological effects of microwave power transmission from a satellite power system (Part 1 and Part 2). Final report, 8:55073 (R;US)
Choudhury, P.R., *See* Gerstein, M., 8:54362, 8:54519

Christ, B., Experience in treatment of components, waste treatment, packaging and shipping related to decommissioning, 8:53935 (RA;US)
Christ, R., TN 1300 shipping/storage cask system for spent fuel, 8:53588 (BA;XN)
See Keese, H., 8:53496
Christensen, D.C., *See* Mullins, L.J., 8:54243
Christensen, J.J., Separation of selected cations by liquid membranes. Progress report, 1 December 1982-31 August 1983, 8:54292 (R;US)
Christensen, T.E., Microwave transmission systems for the plasma separation process, 8:55267 (RA;US)
Christianson, C.C., *See* DeLuca, W.H., 8:54046
See Miller, J.F., 8:54047
Christie, W.H., *See* Young, R.T., 8:53764, 8:54283
Christophorou, L.G., Electron-molecule interactions in gases and liquids: the electron-attachment process in gases and nonpolar liquids, 8:55110 (R;US)
Isotope dependence of the breakdown strength of gases, 8:55109 (R;US)
See Carter, J.G., 8:54550
Chrysostomidis, C., *See* Shirley, C.G., 8:53571
Chung, W.K., *See* Feng, K.K., 8:54814
Churakov, A.K., Index algorithm for forming approximation function in the least square method, 8:55336 (R;SU;In Russian)
Churnetski, E.L., Hierarchical trees for accelerated aging studies, 8:54204 (R;US)
Cirant, S., ECRH system at 28 GH/sub z/ on THOR tokamak, 8:55266 (RA;US)
Clairmont, A.R. Jr., *See* Bernecker, R.R., 8:54797
See Sandusky, H.W., 8:54851
Clark, C.F., *See* Barkhordar, P.M., 8:54164
Clark, J.R., ANSI N14 standards committee, 8:53567 (RA;US)
Clark, T.A., 40-kW on-site fuel-cell unit, 8:54119 (RA;US)
Clauser, J.F., *See* Simonen, T.C., 8:55247
Claverie, R.J., *See* Goldmann, K., 8:53568
Clegg, L.B., *See* Sackett, K.E., 8:54034
Cleland, J.O., TVA's dispersed generation protection requirements - what do they mean, 8:54104 (R;US)
Clemente, G.F., Assessment of plutonium internal contamination in man, 8:55041 (R;XE)
Clements, L.D., Convective heat transfer with a periodic longitudinal heat flux variation, 8:54521 (RA;US)
Cleveland, B., *See* Cherry, M.L., 8:54647
Clifford, J.E., Analysis of lead-acid battery accelerated testing data. Final report, 8:54050 (R;US)
Cline, D.B., Prospects for very large, sensitive water Cherenkov detectors for proton decay and neutrino oscillations search, 8:54650 (RA;US)
Cline, D.D., *See* Trujillo, A.A., 8:54451
Clower, C.A., *See* Simonen, T.C., 8:55247
Coensgen, F.H., *See* Simonen, T.C., 8:55247
Coffey, B.J., Three-dimensional propagation in free-electron laser amplifiers, 8:54512 (J;US)
Coffey, C.S., Experimental investigation of hot spots produced by high rate deformation and shocks, 8:54859 (RA;US)
Cohen, A.D., Premaceral contents of peats correlated with proximate and ultimate analysis, 8:53377 (J;US)
Cohen, N., Body burden estimation of ^{32}P by measurement and calibration of bremsstrahlung radiation produced in the skull, 8:55050 (J;GB)
Cohen, S., *See* Bitter, M., 8:55246
Cohn, S.H., *See* Tothill, P., 8:55055
Colburn, N.I., *See* Daemen, J.J.K., 8:53657
Cole, A.G., *See* Paul, A.C., 8:54594
Cole, B.M., Spent fuel shipping costs for transportation logistics analyses, 8:53557 (RA;US)
Cole, G.D., *See* Porile, N.T., 8:55179
Cole, J.E., *See* Fifer, R.A., 8:54801
Cole, R.L., *See* Hull, J.R., 8:54125
Coley, G.D., Influence of the dynamic compressive strength properties of HE formulations on the growth of reaction, 8:54787 (RA;US)
See Foan, G.C.W., 8:54808
Colley, J.D., *See* Hargrove, O.W. Jr, 8:53391, 8:53392
Collins, J.J., Demographic model for performing site-specific health risk projections, 8:55059 (J;GB)
Colman, J., *See* Kroeger, P.G., 8:53985
Colombant, D.G., Stimulated Brillouin backscatter in long scale length plasmas. Memorandum report, 8:55258 (R;US)
Combs, A.B., Mound's decommissioning experience, tooling, and techniques, 8:53615 (RA;US)
Conetti, S., *See* Cox, B., 8:54716, 8:54719
Connelly, S.M., *See* Griffiths, J.C., 8:53447
Conners, C.C., *See* Kittinger, W.D., 8:53990
Connolly, P.L., *See* Ahrens, L.A., 8:55127
Cook, C.M., Isolation of an active site peptide from spinach ribulose bisphosphate carboxylase/oxygenase modified by glyoxylate, 8:54962 (R;US)
Cookfair, D.L., Lung cancer among workers at a uranium processing plant, 8:55029 (RA;US)
See Beck, W.L., 8:55032
Cooper, D.R.C., Surface characteristics of roads resurfaced using the repave process. Final report, 8:54155 (R;US)
Cooper, J., *See* Cumalat, J., 8:55137
Cooper, M.B., Investigation of the speciation of radionuclides in sediments and soils, 8:54920 (RA;AU)
Natural radioactivity in the production of titanium dioxide pigment: a study of the Laporte plant and environmental behaviour of radionuclides at Bunbury, Western Australia, 8:54921 (RA;AU)
Natural radioactivity in bottled mineral water, 8:54950 (RA;AU)
Radiological impact of the operation of coal-fired power stations within Australia, 8:53365 (RA;AU)
See Moroney, J.R., 8:54919
Cooper, M.D., *See* Baer, H.W., 8:55177
Cooper, R.K., *See* Chao, A.W., 8:54627
Copeland, R.J., Method and apparatus for operating an improved thermocline storage unit, 8:54044 (P;US)
Coppola, A., A risk comparison summary, 8:53429 (BA;US)
Coppola, R., *See* Boeuf, A., 8:54238
Corey, J.C., The relative importance of uptake and surface adherence in determining the radionuclide contents of subterranean crops, 8:54929 (J;GB)
See Adriano, D.C., 8:54931
Corley, J.P., *See* Denahm, D.H., 8:53643
See Ramirez, J.J., 8:54566
Corliss, L.M., *See* Zhuang, J., 8:54241
Cormell, L., *See* Cumalat, J., 8:55137
Cornish, D.N., *See* Hoard, R.W., 8:55310
Corones, J.P., Effects of dissipation in one-dimensional inverse problems, 8:55223 (R;US)
Corrado, J.J., *See* Li, A., 8:54158
Correll, D.L., *See* Simonen, T.C., 8:55247
Cosiol, J., Energy monitoring and control systems inspection guidelines. Final report, 8:54124 (R;US)
Costello, J.M., Assessment of overseas developments in methods for treatment and disposal of high-level radioactive wastes, 8:53601 (R;AU)
Cote, P., *See* Webster, G.D., 8:54196
Couchat, P., *See* Moutonnet, P., 8:54964
Counce, R.M., Scrubbing of gaseous nitrogen oxides in packed towers, 8:53476 (J;US)
Courant, H., *See* Bartelt, J., 8:55124
Cousins, R., *See* Chauvat, P., 8:54713
Coveney, E.A., *See* Moskowitz, P.D., 8:53788
Cover, L.E., *See* Bohn, M.P., 8:54032
Cowan, G.A., Proposed geological solar neutrino flux measurement, 8:55093 (RA;US)
Cowell, G.K., Axially staggered seed-blanket reactor-fuel-module construction, 8:53904 (P;US)
Cowperthwaite, M., Constitutive model for calculating chemical energy release rates from the flow fields in shocked explosives, 8:54822 (RA;US)
Lagrange gage studies in ideal and non-ideal explosives, 8:54867 (RA;US)
Phenomenology of the deflagration to detonation transition in propellants and explosives, 8:54805 (RA;US)
Cox, B., High energy electromagnetic shower position measurement by a fine grained scintillation hodoscope, 8:54716 (RA;US)
Measurement of the response of an SCG1-C scintillation glass shower detector to 2-17.5 GeV positrons, 8:54719 (RA;US)
Cox, C., *See* Rinsky, R.A., 8:55010
Cox, E.J., *See* Garde, R., 8:53613
Cox, M.K., *See* Ackerman, A.D., 8:54143
Cox, S.A., Tritium monitor with improved gamma-ray discrimination, 8:54750 (P;US)
Crabb, T.B., Eucalyptus plantations for energy production in Hawaii, 8:53766 (RA;US)
Crabtree, G.W., *See* Shenoy, G.K., 8:54288
Craddick, E.C., Developer's point of view concerning geothermal resources in Hawaii, 8:53830 (RA;US)
Craemer, B., Design of reactor protection systems for HTR plants generating electric power and process heat problems and solutions, 8:53888 (R;XA)
Craig, G.W., *See* Fajer, J., 8:54339
Craig, R.W., *See* Sammel, E.A., 8:53829

Crandall, D.H., Electron-ion collisions, 8:55239 (R;US)
Craven, J.P., Development of ocean thermal energy conversion, 8:53797 (RA;US)
Crawford-Brown, D.J., Impact of radiobiological considerations on epidemiological inferences of age-dependent radiosensitivity, 8:55038 (RA;US)
Crebbin, K.C., Characteristic time structure in slow resonant extracted beam, 8:54621 (R;US)
Creech, E.T., *See* Wallace, S.A., 8:53687
Creedon, R.L., *See* Hopkins, G.R., 8:55291
Cremers, D.A., *See* Radziemski, L.J., 8:54889
Creutz, M., Progress in lattice gauge theory, 8:55157 (R;US)
Crevier, W.F., Evaluation of AURORA as a tactical source region simulation. Contractor report, 8:54754 (R;US)
Cristy, M., Representative breast size of reference female and reply, 8:55216 (J;GB)
Croes, B., *See* Datta, R., 8:54320
Crooks, G., *See* Barkhordar, P.M., 8:54163, 8:54164
Crooks, R., *See* Kenik, E.A., 8:54233
Cross, R.E., *See* Cole, B.M., 8:53557
Cross, R.W., *See* Bergstrom, K.A., 8:53680
Crow, J.T., *See* Burns, E.J.T., 8:55300
See Dreike, P.L., 8:55299
See Mendel, C.W. Jr., 8:55297
Crowder, A.A., *See* Taylor, G.J., 8:54912
Crowther, M.A., *See* Rowe, M.D., 8:54149
Cumalat, J., High-energy photoproduction of states containing heavy quarks and other rare phenomena, 8:55137 (R;US)
Cummins, W.F., *See* Simonen, T.C., 8:55247
Cuneo, A.A. Jr., Physical and computer modeling of military earth grounding practices in a HEMP (high-altitude electromagnetic pulse) environment. Technical memo, 8:54757 (R;US)
Curren, W.D., *See* Bond, R.D., 8:53711
Curtis, C.W., Cooperative investigation by Auburn University and Cities Service Research and Development Company of combined coal and heavy-resid processing. Quarterly report, January 15, 1983-April 15, 1983, 8:53345 (R;US)
See Tarrer, A.R., 8:53338, 8:53339, 8:53340, 8:53341, 8:53343
Curtis, H.W., *See* Lenail, B., 8:53565
Curto, P., Repowering with solar energy, 8:53791 (R;US)
Cutts, D., *See* Ahrens, L.A., 8:55127
Cuzner, G.J., *See* Tansley, R.S., 8:54373
Cuzzaniti, M., Spent fuel dry-storage system for Trino Vercellese nuclear power plant, 8:53585 (BA;XN)
Cverna, F., *See* Baer, H.W., 8:55177

D

D'yachenko, A.F., *See* Bomko, V.A., 8:54565
Dadyan, A.T., *See* Vasinyuk, I.E., 8:54678
Daemen, J.J.K., Rock mass sealing: experimental assessment of borehole plug performance. Annual report, June 1982-May 1983, 8:53657 (R;US)
Dahm, H., *See* Craemer, B., 8:53888
Dahmen, U., HVEM studies of precipitate morphology symmetries, 8:54225 (RA;US)
See Ackland, D., 8:54226
Daling, P.M., Shipping cask demand associated with US government storage of commercial spent fuel, 8:53530 (RA;US)
Dalling, D.K., *See* Morin, F.G., 8:54327
Dalrymple, D.A., *See* Honerkamp, R.L., 8:53349
Daly, T.A., *See* Matos, J.E., 8:53955
Damamme, G., Chapman-Jouguet detonation and its acceleration for a perfect fluid without conduction, 8:54832 (RA;US)
Simulation of the reaction zone of heterogeneous explosives, 8:54833 (RA;US)
Damm, C.C., *See* Simonen, T.C., 8:55247
Daniel, W., *See* Amrhein, W., 8:54129
Danos, M., *See* Rafelski, J., 8:55190
Danso, S.K.A., *See* Hardarson, G., 8:54990
See Pang, P.C.K., 8:54991
Dareing, D.W., *See* McDonald, W.J., 8:53430
Datsko, V.S., Increasing uniformity of light collection in extended scintillation counters by means of spectral shift of scintillator emission, 8:54681 (R;SU;In Russian)
See Antipov, Yu.M., 8:54698
Datta, R., Transient response of continuous-flow stirred reactors containing heterogeneous systems for catalysis or sorption, 8:54320 (J;GB)
Daugherty, J.M., Review and assessment of reduced emissions/clean burning diesel engines for integration into the Army inventory. Final technical report, 8:54195 (R;US)
Daughton, C.G., High-pressure liquid chromatographic gradient mixer, 8:54486 (P;US)
Purifying contaminated water, 8:53463 (P;US)
David, M.H., *See* Joeres, E.F., 8:54061
Davidson, I., *See* Cherry, M.L., 8:54647, 8:54653
Davis, A., Data base for the analysis of compositional characteristics of coal seams and macerals. Quarterly technical progress report, May-July 1982, 8:53399 (R;US)
Davis, J., *See* Jacobs, V.L., 8:55103
Davis, J.D., *See* Bergstrom, K.A., 8:53680
Davis, L.P., *See* Pugh, H.L., 8:54793
Davis, M., *See* Hamid, A., 8:54153
Davis, R. Jr., *See* Cherry, M.L., 8:54647
Davis, W.P., *See* Combs, A.B., 8:53615
Davis, W.T., Reactivity of fly ashes in a spray dryer FGD process, 8:53386 (R;US)
Davison, M.E., *See* Corones, J.P., 8:55223
Davydenko, Yu.P., *See* Bushnin, Yu.B., 8:54579
Daw, C.S., *See* Fuller, E.L. Jr., 8:53373
Dawson, J.W., *See* Kim, S.H., 8:54471
Day, W.M., *See* Billings, R.B., 8:54068
de Jong, E.J., *See* Keyser, R.E., 8:54886
de Longueville, Y., Influence of inert binders on detonation properties of cast-cured PBX, 8:54827 (RA;US)
See Bonthoux, F., 8:54818
See Deneuville, P., 8:54825
De Marco, I., Critical evaluation of the results given by the INTERTRAN code: an example of parametric analysis to study the influence of the various components on the final result, 8:53490 (RA;US)
Statistical data on the transport of radioactive materials in Italy and radiation dose evaluation to transport workers, 8:53703 (RA;US)
See Orsini, A., 8:53512
de Rey, B.M., Effects of uranium compounds on skin. Final report for the period 1 July 1980 - 31 October 1982, 8:55043 (R;XA)
Deacon, D., *See* Maxwell, E.O., 8:53594
DeCarlo, R., Decentralized control of large transient in power systems: theory and application. Final report, January 1981-August 1983, 8:53855 (R;US)
Decher, U., Evaluation and demonstration of methods for improved fuel utilization. Seventh semi-annual progress report, October 1, 1982-March 31, 1983, 8:53874 (R;US)
Decreton, M.C., High temperature measurement by noise thermometry, 8:53881 (R;XA)
Deen, J.R., Analytical study of using cadmium burnable absorbers in LEU fuel elements, 8:53958 (R;US)
DeFord, H.S., *See* Ballou, J.E., 8:55064
Dehne, K., *See* Kasten, F., 8:53757
Dehos, R., Strontium-90 in the teeth of Bavarian children, 8:55044 (R;DE;In German)
Deichelbohrer, P.R., Arc saw and its application to decommissioning, 8:53621 (RA;US)
DeJesus, O.T., *See* Friedman, A.M., 8:54972
deJong, D.L., *See* Miller, C.G., 8:53778
DeLafosse, P.H., Program for the improvement of downhole drilling motor bearings and seals. Phase V. Final report, 8:53836 (R;US)
Delahoy, A.E., Effects of monochlorosilane on the properties of plasma deposited hydrogenated amorphous silicon, 8:54290 (J;US)
Delanny, F., Low temperature methane production by the catalyzed reaction of graphite and water vapor, 8:53358 (J;US)
Delclos, A., *See* de Longueville, Y., 8:54827
Delmore, J.E., *See* Fernandez, S.J., 8:53647
Delpuech, A., Molecular electronic structure and initiation of secondary explosives, 8:54792 (RA;US)
DeLuca, W.H., Comparative response of lead-acid and nickel/iron batteries to pulsed and constant-current loads, 8:54046 (R;US)
Demeester, J., *See* Price, M.S.T., 8:54429
Dement'ev, E.A., *See* Aksinenko, V.D., 8:54699
Demirkhanyan, M.Kh., *See* Vasinyuk, I.E., 8:54678
Denahm, D.H., Guide for radiological characterization and measurements for decommissioning of US Department of Energy surplus facilities, 8:53643 (R;US)
DeNatale, J.F., Electron radiation damage in silicate glasses, 8:54280 (RA;US)

Deneuville, P., Comparison of TATB and DINGU explosive properties, 8:54825 (RA;US)
See Bonthoux, F., 8:54818
See Maurin, C., 8:54800
Denton, J., Private-sector geothermal development, 8:53832 (RA;US)
Deramaix, P., *See* Price, M.S.T., 8:54429
DeRemer, R.B., *See* Griffiths, J.C., 8:53447
Derenzo, S.E., Dynamic positron emission tomography in man using small bismuth germanate crystals, 8:54752 (BA;NL)
Derr, R.L., *See* Boggs, T.L., 8:54804
Derrien, J.C., *See* Maurin, C., 8:54800
Desai, P.D., Electrical resistivity of vanadium and zirconium. State-of-the-art report, 8:54207 (R;US)
Desai, N.J., Catalytic fluidized-bed combustion. Enhancement of sulfation of calcium oxide by iron oxide, 8:54367 (J;US)
Descroix, E., *See* Chamcham, K., 8:55193
Dettman, G., *See* Cohen, N., 8:55050
Deutsch, W.J., *See* Krupka, K.M., 8:53675
DeVan, J.H., *See* Gray, R.J., 8:53364
Devary, J.L., Permian potentiometric analysis, 8:53676 (R;US)
Devaud, G., Compensated amorphous-silicon solar cell, 8:53787 (P;US)
Devell, L., Exemption of low-level decommissioning waste from controlled handling and disposal, 8:53626 (RA;US)
Deveney, J.E., *See* Vigil, M.G., 8:54389
DeVore, C.R., *See* Sheeley, N.R. Jr, 8:55088
Di Paolo, A., *See* Belli, P., 8:55293
Dibble, W., *See* Potter, J., 8:53841
DiBona, B.G., *See* DeLafosse, P.H., 8:53836
Dickson, H.W., *See* Auxier, J.A., 8:55048
Didenko, L.A., *See* Grishin, V.G., 8:55173
Diebold, R., Angular coverage of detectors, 8:54724 (RA;US)
Rates and time structure expected from $\sqrt{s} = 40$ TeV colliders, 8:54592 (RA;US)
Diegle, R.B., Chemical properties of metallic glasses, 8:54239 (R;US)
Diel, J.H., Fragmentation of inhaled $^{238}PuO_2$ particles in lung, 8:55054 (J;GB)
See Mewhinney, J.A., 8:55058
Dierckx, L., *See* Price, M.S.T., 8:54429
Dietz, R.N., Perfluorocarbon tracer method for air-infiltration measurements, 8:54146 (P;US)
Diggs, J.M., Testing to define the sensitivity of small Type B packagings to the proposed IAEA crush test requirement, 8:54391 (RA;US)
Thermal testing in support of the TRUPACK development program, 8:53544 (RA;US)
See Nelsen, J.M., 8:54440
DiGuiseppe, C.P., *See* Cowell, G.K., 8:53904
Dike, D.H., Propsects for commercial tar sand development: an appraisal of the institutional, technical, and economic factors that affect decisionmaking, 8:53461 (RA;US)
Dilmanian, F.A., *See* Jaeaeskelaeinen, M., 8:55192
Dimitrov, Kh., *See* Ableev, V.G., 8:55171
Dimov, G.I., Production of intensive beams of hydrogen anions, 8:55323 (TG;DE;In German)
Dinerstein, R., *See* Friedman, A.M., 8:54972
Dinev, D.Kh., Orbit correction in a heavy-ion synchrotron, 8:54586 (R;SU;In Russian)
Orbit correction in synchrotrons. Review, 8:54587 (R;SU;In Russian)
Ding, J., Short survey of detonation research in China, 8:54847 (RA;US)
Dinsmore, S.R., System for analyzing coal-liquefaction products, 8:53382 (P;US)
Dischler, S.A., *See* Daemen, J.J.K., 8:53657
DiStefano, J., Significant recent developemnts in the United States courts affecting nuclear materials transportation, 8:53538 (RA;US)
Dixon, G., *See* Duggleby, J.C., 8:54896
Doane, J.L., ECRH transmission systems for PDX, PLT, TFTR and upgrades, 8:55275 (RA;US)
Dobecki, T.L., Measurement of in situ dynamic properties in relation to geologic conditions, 8:53953 (J;US)
Dobremelle, *See* Geffroy, 8:53560
Dobremelle, M., *See* Sugier, A., 8:53587
Dodd, B., Decommissioning of the Oregon State University AGN-201 Reactor, 8:53995 (RA;US)
Doelling, H.H., Bibliography of Utah radioactive occurrences. Volume I, 8:53464 (R;US)
Bibliography of Utah radioactive occurrences. Volume II, 8:53465 (R;US)
Doerschel, B., Calibration of a special neutron dosemeter based on solid-state track detectors and fission radiators in various neutron fields, 8:54742 (R;DD;In German)
Multi-channel spark counter for reading neutron dosemeters with plastic track detectors, 8:54744 (R;DD;In German)
Physical fundamentals for evaluating neutron-irradiated solid-state track detectors by light transmission measurements, 8:54736 (R;DD;In German)
See Gruellich, A., 8:55214
See Pretzsch, G., 8:54743
See Streubel, G., 8:54623
Doke, T., β rays dosimetry with stack type detectors in β and γ rays mixed fields, 8:54733 (R;JP;In Japanese)
Dolan, J.E., Rim-drive cable-aligned heliostat collector system, 8:53825 (P;US)
Doll, D.W., Articulated limiter blade for a tokamak fusion reactor, 8:55321 (P;US)
Domaracki, A.J., *See* Sistla, G., 8:54894
Donaldson, R.R., Design and construction of a large, vertical-axis diamond turning machine, 8:54478 (R;US)
Donaldson, T.L., *See* Strandberg, G.W., 8:53741
Donatelli, D.E., Electron beam-induced electromagnetic waves in a magnetospheric plasma. Technical report, 8:55099 (R;US)
Donguy, P., Numerical simulations of non-ideal detonations of a heterogeneous explosive with the two dimensional eulerian code C.E.E., 8:54837 (RA;US)
Donlon, W.T., In situ ion implantation of N^+ in aluminum, 8:54222 (RA;US)
Donnelly, R.F., *See* Puga, L.C., 8:55096
Dore, J.S., *See* Barkhordar, P.M., 8:54164
Dorey, R.C., *See* Pugh, H.L., 8:54793
Dorn, D.W., *See* Blink, J.A., 8:53727
Dornsife, W.P., Decommissioning of radioactively contaminated facilities from a state perspective, 8:53609 (RA;US)
Doron, A., *See* Baer, H.W., 8:55177
Doroszlai, P., MODREX: storage in concrete silos and/or iron casks, 8:53586 (BA;XN)
Doroszlai, P.G.K., Heat dissipation by natural convection of circumferentially finned spent fuel transport casks, 8:54437 (RA;US)
Douglas, L., Evaluation of nondistillation ethanol-separation processes, 8:53744 (R;US)
Dow, J.D., *See* Buisson, J.P., 8:54286
See Schulman, J.N., 8:55120
Dowdy, E.J., *See* Caldwell, J.T., 8:53475
Downey, J.R., Calculation of late-time surface burst EMP (electromagnetic pulse) fields using a time-independent numerical method. Master's thesis, 8:54755 (R;US)
Downey, P.C., Aquaculture techniques: a production forecasting model for aquaculture systems. Technical completion report, 8:53779 (R;US)
Downey, S.W., *See* Miller, C.M., 8:55116
Downs, G.T., *See* Todd, L.L., 8:54148
Draulans, J., Stowing of packages containing radioactive materials on conveyances in normal and accidental conditions, 8:53569 (RA;US)
Dreike, P.L., Applied-B ion diode experiments on PBFA I, 8:55299 (R;US)
See Burns, E.J.T., 8:55300
See Olsen, J.N., 8:55302
Dremin, A.N., Decomposition reaction kinetics in shock wave front, 8:54846 (RA;US)
Drexler, G., *See* Cristy, M., 8:55216
Drobnis, D.D., Applying process-control techniques to a research environment: on-line controls & instrumentation for Doublet III fusion project, 8:55292 (R;US)
Droste, B., Qualification and certification criteria of casks for the intermediate dry storage of spent fuel in the Federal Republic of Germany, 8:54385 (RA;US)
Selection and certification of materials for casks intended for the transport and intermediate storage of spent fuel, 8:54434 (RA;US)
See Aurich, D., 8:54380
Dryer, M., Magnetohydrodynamic modelling of interplanetary disturbances between the sun and earth. Environmental research papers, 8:55092 (R;US)
Dubau, J., *See* Bitter, M., 8:55246
Dubinsky, R., Economic feasibility of alternative utility-sponsored weatherization programs: the case of baltimore gas and electric company. Final report, 8:54141 (R;US)
Duce, F.A., *See* Burr, J.R., 8:53648
Duchane, D.V., Coated foams, preparation, uses and articles, 8:53725 (P;US)

Duchazeaubeneix, J.C., Proton nuclear scattering radiography, 8:54971 (R;FR)
Duffey, T.A., *See* Vigil, M.G., 8:54389
Duffy, C.J., *See* Benjamin, T.M., 8:55094
Duggleby, J.C., Environmental radiation monitoring, 8:54896 (RA;AU)
Duncan, D.W., *See* Bergstrom, K.A., 8:53680
Dunks, G.B., Electrochemical studies of molten sodium carbonate, 8:54337 (J;US)
Dunlap, B.D., *See* Shenoy, G.K., 8:54288
Dunning, D.E., Estimates of internal-dose equivalent from inhalation and ingestion of selected radionuclides, 8:55046 (R;US)
Dunning, D.E. Jr., *See* Schwarz, G., 8:55062
DuPont, C.S., Concerns in establishing PURPA regulations, 8:54087 (RA;US)
Duret, B., Behaviour of UF_6 package in fire: comparison of calculations with experiment, 8:54415 (RA;US)
Durran, D.A., F-atom depletion in Nf^3 combustor laser flows. Technical report, 8:54494 (R;US)
See Spencer, D.J., 8:54492
Durst, M., Time-series models with many discrete alternatives, 8:55342 (R;US)
Duwe, R., *See* Brinkmann, H.U., 8:53529
Dvurecenskij, A., One problem of the busy period determination in queues with infinitely many servers, 8:54701 (R;SU)
Dybeck, P., *See* Rittscher, D., 8:53637
Dyer, A.S., Factors affecting the explosiveness of munition fillings, 8:54864 (RA;US)
Dyrkacz, G.R., Some variations of properties of coal macerals elucidated by density gradient separation, 8:53374 (J;US)
See Silbernagel, B.G., 8:53376
Dyson, J.R., *See* Burnay, S.G., 8:53602

E

Eakes, R.G., *See* Sutherland, S.H., 8:53540
Eatherly, W.P., *See* Sanders, J.P., 8:53906
Eberhardt, L.L., *See* Thomas, J.M., 8:53678
Ebert, T.A., Longevity, life history, and relative body wall size in sea urchins, 8:54980 (J;US)
Ebisu, T., Fundamental studies on the performance of O-ring seal for cask, 8:54412 (RA;US)
Eckert, J., Condensed matter research at the Los Alamos pulsed neutron source (WNR), 8:55118 (J;NL)
Eckstein, A., *See* Sentman, L.H., 8:54840
Eddingfield, D.L., Mathematical modeling of high velocity water jets, 8:54487 (BA;US)
Techniques for the measurement of the air-water distribution in the flowfield of a high velocity water jet, 8:54488 (BA;US)
Eden, G., *See* Bailey, W.A., 8:54835
Eden, J.G., Alkali-rare gas and metal-halide molecules as potential tunable and efficient lasers in the visible. Final report, 1 October 1981-30 September 1982, 8:54499 (R;US)
Edminster, D., *See* Keller, L.P., 8:54605
Edwards, J.G., Large aperture calorimeter for fusion laser measurements, 8:55295 (R;US)
Edwards, N.T., A timesaving technique for measuring respiration rates in incubated soil samples, 8:54913 (J;US)
Egawa, K., *See* Mutou, M., 8:54609
Eggers, P.E., Storage and transportation of spent fuel and high-level waste using dry storage casks, 8:53497 (RA;US)
Eggert, R.J., Potential for salt-gradient solar ponds in New York State. Final report, 8:53808 (R;US)
Ehst, D.A., *See* Iida, H., 8:55237
Einfeld, K., Operating experience of cask-type dry storage and spent fuel performance, 8:53495 (RA;US)
See Fleisch, J., 8:53583
Eirich, A.J., *See* Miller, C.E. Jr., 8:54004
Eisenhauer, C.M., *See* Schwartz, R.B., 8:55212
El Nadi, A.M., Effect of magnetic bending on the high-frequency stability of the ELMO Bumpy Torus, 8:55240 (R;US)
El'shin, A.V., *See* Laletine, N.I., 8:53915
El Wakil, S.A., Particle transfer in multiregion, 8:55204 (R;XA)
Elban, W.L., Microhardness study of RDX to assess localized deformation and its role in hot spot formation, 8:54860 (RA;US)
See Sandusky, H.W., 8:54851
Elert, M., *See* Ericsson, A.M., 8:53489
Eliseev, S.M., *See* Grishin, V.G., 8:55173
Elizarov, O.I., *See* Bogdzel', A.A., 8:54705
See Vagov, V.A., 8:54693
Elkind, M.M., *See* Suzuki, F., 8:55052
Ellett, J., VIRTUS: a multi-processor event selector using FASTBUS, 8:54730 (RA;US)
See Chauvat, P., 8:54713
Elliott, C.J., *See* Coffey, B.J., 8:54512
Elliott, G., *See* Mason, G.C., 8:53604
Ellis, J.B., Incidence of heavy metals in street surface sediments: solubility and grain size studies, 8:54917 (J;NL)
Ellis, J.S., MFR total ozone grid point data, 8:54877 (R;US)
Ellis, L.C., *See* Wolfe, M.L., 8:54908
Ellis, W.E., *See* Burnett, P., 8:53879
Elsholz, W.E., Fabrication of glass microspheres with conducting surfaces, 8:53726 (P;US)
Elswick, T.C., *See* Combs, A.B., 8:53615
Elton, J., *See* Oesterreicher, H., 8:54312
Emerson, E.L., US accident/incident experience in the transportation of nuclear fuel cycle material (1971-1982), 8:53525 (RA;US)
Emery, M.H., *See* Grun, J., 8:55257
Emmert, G.A., Task II: ECRH and transport modeling in tandem mirrors and divertor physics. Annual progress report on fusion plasma theory, January 1, 1983-December 31, 1983, 8:55241 (R;US)
Endo, J., *See* Tamura, M., 8:53975
Endo, T., Improvement of ISI techniques by multi-frequency eddy current testing method for steam generator tube in PWR plant, 8:53875 (R;JP)
Engel R.L., *See* Daling, P.M., 8:53530
Engelhardt, A.L., How to run a community recycling center: a resource guide to low-technology recycling in Illinois, 8:54188 (R;US)
Engelmann, R., Warm measurements of CBA superconducting magnets, 8:54576 (R;US)
Engels, B., Improving the torque behaviour of exhaust gas-turbocharged vehicle diesel engines, 8:54199 (R;DE;In German)
Engelstaedter, R., *See* Brinkmann, H.U., 8:53529
England, A., ATF-1 program objectives, 8:55271 (RA;US)
England, A.C., Antennas and waveguides for electron-cyclotron heating of plasmas, 8:55260 (R;US)
Ensworth, C.B.F., *See* Miller, D.R., 8:53848
Epperson, D., *See* Bernatowicz, H., 8:53719
Erckmann, V., *See* Thumm, M., 8:55276
Erdreich, L.S., Health assessment document for manganese. External review draft, 8:55071 (R;US)
Erickson, B.H., Comparison of stem-spermatogonial renewal and mitotic activity in the γ-irratiated mouse and rat, 8:55053 (J;NL)
Erickson, P.A., *See* Bopp, W.B., 8:55339
Ericsson, A.M., Worlwide risk assessment on the transportation of radioactive materials, 8:53489 (RA;US)
Ermolaev, B.S., *See* Khasainov, B.A., 8:54820
Eser, E., Junction geometry in Cu_2S/CdS or Cu_2S/Cdsub(1-x)Znsub(x)S solar cells prepared by the solution reaction method, 8:53785 (J;CH)
Espallardo, J.A., *See* Melches, C., 8:53584
Espenson, J.H., *See* Chen, J.T., 8:54314
Essmann, J., Plans and activities for decommissioning of LWR power plants by the German utilities, 8:54003 (RA;US)
Ethridge, T.R., *See* Bostwick, L.E., 8:53335
Ette, A., *See* Raghavan, S., 8:54172
Ettehadieh, B., *See* Gidaspow, D., 8:54364
Evans, D.B., *See* Hunt, A.J., 8:53826
Evans, J.C., *See* Abel, K.H., 8:54000
Evensen, E., Fluidised bed combustion. an overview of the Norwegian program, 8:53421 (R;US)
Evers, J.L., *See* Eddingfield, D.L., 8:54487, 8:54488
Evstratov, V.D., *See* Pavlinov, L.V., 8:54212
Eychner, D.M., *See* Carnes, B.A., 8:55333
Eyler, L.L., *See* Trent, D.S., 8:54035

F

Faehrmann, M., *See* Pretzsch, G., 8:54745
Failor, B.H., *See* Simonen, T.C., 8:55247
Fairman, W.D., Automated low-background alpha-counting system with large-area silicon detector, 8:54673 (R;US)
Faivre, J.C., *See* Duchazeaubeneix, J.C., 8:54971
Fajer, J., Anion radicals of bacteriochlorophylls c, d, and e. Likely electron acceptors in the primary photochemistry of green and brown photosynthetic bacteria, 8:54339 (J;US)

Falco, J.J., Corrosion evaluation of stove pipe materials and surface treatments. Final report, 8:54126 (R;US)
Falkowski, P.G., Effects of continuous-background irradiance on xenon-flash-induced fluorescence yields in marine microalgae, 8:54967 (R;US)
Faloci, C., Problems of the educational training: quality and quantity of the workers involved in the transport of radioactive materials, 8:53573 (RA;US)
See De Marco, I., 8:53703
See Orsini, A., 8:53512
Fan, L.T., Measurements of the rise velocities of bubbles, slugs and pressure waves in a gas-solid fluidized bed using pressure fluctuation signals, 8:54526 (J;US)
See Yutani, N., 8:54527
Fand, I., *See* Som, P., 8:54969
Farmer, J.C., *See* Muller, R.H., 8:54765
Farnsworth, A.V. Jr., *See* Mehlhorn, T.A., 8:55304
Farnum, B.W., Analysis of lignite liquefaction products processed with syngas and hydrogen sulfide, 8:53381 (J;US)
Farnum, S.A., *See* Farnum, B.W., 8:53381
Farquhar, O.C., Geologic concepts for cavern storage between Washington and Boston, 8:54043 (RA;US)
Fasching, G.E., Ash level meter for a fixed-bed coal gasifier, 8:53362 (P;US)
Modulated control system for improved regulation in on/off mode automatic controllers, 8:53363 (P;US)
Fassel, V.A., *See* Rice, G.W., 8:54293
Fecht, K.R., *See* Bergstrom, K.A., 8:53680
Fedukov, S.V., *See* Zabolotin, V.P., 8:54584
Fedunov, A.G., *See* Golovin, V.M., 8:54585
Fee, D.C., Solid-oxide fuel cells, 8:54117 (R;US)
Solid-oxide fuel-cell performance, 8:54120 (R;US)
Feinberg, D., *See* Douglas, L., 8:53744
Feldt, W., Radioecology, 8:54923 (R;DE;In German)
Felici, S., *See* Cuzzaniti, M., 8:53585
Fellinger, J., Homogeneous TL dosemeter for direct reading of the biological radiation exposure in mixed neutron-gamma fields, 8:54735 (R;DD;In German)
Felmy, A.R., *See* Peterson, S.R., 8:54926
Feng, K.K., Formation and distribution of hot spots in slurry explosives under projectile impact, 8:54814 (RA;US)
Ferber, M.K., *See* Finch, C.B., 8:54265
Ferguson, P., *See* Dahmen, U., 8:54225
Ferguson, S.W., *See* Ouimette, D.R., 8:55036
See Reif, J.S., 8:55034
Ferlay, A., *See* Arnal, T., 8:54395
Fernandez, C., *See* Nolan, D.J., 8:54468
Fernandez, S.J., Determination of low specific activity iodine-129 off-gas concentrations by GC separation and negative ionization mass spectrometry, 8:53647 (R;US)
See Burr, J.R., 8:53648
Ferraudi, G., *See* Prasad, D.R., 8:54315
Fetterman, H.R., *See* Temkin, R.J., 8:54555
Field, J.E., *See* Swallowe, G.M., 8:54788
Fielden, J.M., *See* Fore, C.S., 8:53502
Fields, D.E., Computation of radionuclide particulate finite area fugitive source strengths, 8:54899 (J;GB)
Numerical analysis of burial ground geography, 8:53684 (J;GB)
Fifer, R.A., Transitions from laminar burning for porous crystalline explosives, 8:54801 (RA;US)
Figard, J.E., *See* Moore, K.J., 8:54340
Filipkowski, A., *See* Ableev, V.G., 8:55171
Finch, C.B., Growth and properties of $Ni_{20.2}Ti_{2.7}B_6$ (tau-phase) crystals, 8:54265 (J;NL)
Finch, T., Commercial wind energy conversion systems (wecs) monitoring and utility impacts study. Final report, 8:53850 (R;US)
Finn, S.P., *See* Rosen, L.C., 8:54037
Fisher, R.M., Proceedings of the seventh international conference on high voltage electron microscopy, 8:54766 (R;US)
Structure of electrodeposited chromium, 8:54227 (RA;US)
Fisher, W.L., Tars and heavy crude in Texas, 8:53451 (RA;US)
Flaming, R.M., *See* Cashwell, J.W., 8:53556
Flanders, B.S., *See* Friesel, D.L., 8:54748
Fleisch, J., Long-term dry storage demonstration with spent LWR fuel, 8:53583 (BA;XN)
See Brinkmann, H.U., 8:53529
See Einfeld, K., 8:53495
See Kaspar, G., 8:53589
Flerov, G.N., *See* Ter-Akopyan, G.M., 8:54761
Fletcher, J.F., Monitored retrievable storage: a waste management option for spent fuel and high-level wastes, 8:53679 (R;US)
Flew, E.M., Radioactive waste disposal by UKAEA establishments during 1981 and associated environmental monitoring results, 8:53603 (R;GB)
Fliermans, C.B., Effectiveness of bromicide against Legionella pneumophila in a cooling tower, 8:55070 (R;US)
Foa, L., New particles and decays, 8:55131 (RA;XC)
Foan, G.C.W., Shock initiation in gap test configurations, 8:54808 (RA;US)
Fogle, W.E., *See* Mayberry, M.C., 8:54764
Fondeur, F., Natural regulating valve, 8:53813 (P;FR;In French)
Fontana, D.R., *See* Schneider, M.J., 8:55067
Forasassi, G., *See* Aquaro, D., 8:54467
Forbes, J.W., *See* Liddiard, T.P., 8:54811
Ford, C.L. Jr., Use of computers for meeting future challenges in traffic management, 8:53547 (RA;US)
See Brooks, G.B., 8:53470
Ford, J.C., Annotated bibliography on the biological effects of constructing channels, jetties, and other coastal structures. Miscellaneous report, 8:54939 (R;US)
Fore, C.S., Legislative and Regulatory Information System: a research tool for transporting radioactive materials, 8:53502 (RA;US)
See Joy, D.S., 8:53579
Forman, A., *See* Fajer, J., 8:54339
Fowler, J.S., *See* Som, P., 8:54969
Fowler, N., Governor's energy conference - Hawaii's energy options for the 80s, 8:54053 (R;US)
Fox, R.L., Downhole steam generator using low pressure fuel and air supply, 8:53435 (P;US)
Frachet, *See* Geffroy, 8:53560
Fradin, J., *See* Roy, J.C., 8:54518
Frankel, M.J., Hot spot and bulk temperature induction in shock compressed explosives, 8:54824 (RA;US)
See Coffey, C.S., 8:54859
Fraser, J.S., *See* Warren, R.W., 8:54511
Fredlund, G.G., *See* Kolb, C.R., 8:53665
Freeman, A.J., Electronically induced phase transformations. Annual report 1 Oct 81-30 Sep 82, 8:54270 (R;US)
Freeman, J.M., Fundamental physics research at Harwell in the 1950s. 1. The Independent Research Group (Nuclear Physics Division), 8:55084 (R;GB)
Freire-Canosa, J., *See* Naqvi, S.J., 8:53596
Freitas, G., Tax credits claimed by Hawaii residents, 8:53762 (RA;US)
Fretter, E.F., *See* Laub, B., 8:54403
Freund, H.U., Dismantling techniques for reactor components using explosives. Feasibility experiments for dismantling the biological shield and the pressure vessel of power reactors, 8:53998 (RA;US)
Frey, R.B., Initiation of explosive charges by rapid shear, 8:54789 (RA;US)
Nondetonative explosions in confined explosive charges, 8:54806 (RA;US)
See Howe, P.M., 8:54865
Friart, D., Damage threshold measurements at 1.06 μm at Centre d'Etudes de Limeil, 8:55259 (R;FR)
Fried, A., Application of photothermal techniques for trace detection of NO_2 in the troposphere, 8:54878 (R;US)
Friedman, A.M., Measurements, in vivo, of parameters of the dopamine system, 8:54972 (R;US)
Friesel, D.L., Variable geometry high-purity germanium detector telescope system for use with intermediate energy charged particles, 8:54748 (J;NL)
Frieze, W.E., *See* Lynn, K.G., 8:55106
Friley, J., *See* Trujillo, A.A., 8:54451
Fritsch, W., *See* Lin, C.D., 8:55107
Frome, E.L., *See* Lushbaugh, C.C., 8:55009
Frost, C.R., *See* Naqvi, S.J., 8:53596
Fry, C.J., Heat transfer in a dry horizontal spent LWR fuel assembly (experimental validation of the computer code RIGG), 8:53543 (RA;US)
Fry, J., Construction of radon/radon daughter calibration chamber, 8:54659 (RA;AU)
Fry, S.A., *See* Checkoway, H., 8:55008
See Hudson, D.H., 8:55018
See Lushbaugh, C.C., 8:55009
See Robie, D.M., 8:55022
Fuchs, W., Study on a drive with synchronous engine for electric powered vehicles, 8:54200 (R;DE;In German)
Fuenkajorn, K., *See* Daemen, J.J.K., 8:53657
Fugitt, J.A., *See* Lancaster, H.D., 8:54628

Fujii, Y., *See* Shimazaki, J., 8:53948
Fujikawa, T., *See* Ohta, T., 8:54644
Fujimoto, K.R., *See* Ashmore, J.P., 8:55040
Fujino, T., *See* Noda, A., 8:54582
Fujita, H., Crystalline-amorphous transition in NiTi alloys induced by high-energy electron irradiation, 8:54234 (RA;US)
Fujita, I., *See* Fajer, J., 8:54339
Fujita, M., *See* Fujita, H., 8:54234
Fujita, Y., Development of a new digital divider system for the charge division method, 8:54688 (R;JP;In Japanese)
High resolution position detecting system with a SWPC for electron spectroscopy, 8:54685 (R;JP)
Proposal of new avalanche mode detector for high energy heavy ion and particle physics experiments, 8:54689 (R;JP;In Japanese)
Theoretical analysis of charge division proportional counter, 8:54687 (R;JP;In Japanese)
Fukuda, S., *See* Abe, H., 8:54441
See Aoki, S., 8:53507
See Saegusa, T., 8:53545
Fukui, S., *See* Endo, T., 8:53875
Fukumoto, H., *See* Hashikura, H., 8:53976
Fukushima, T., Apparatus for contact reaction, 8:54490 (TG;US)
Fulcher, M., Electric-vehicle operations at the Hawaiian Telephone Company, 8:54151 (RA;US)
Fuller, E.G., Photodisintegration of the deuteron, 1982, 8:55166 (R;US)
Fuller, E.L. Jr., Chemistry and structure of coals: air oxidation studies related to fluidized bed combustion, 8:53373 (J;US)
Fulton, P.A., *See* Meyer, R.F., 8:53449
Fultz, W.C., *See* Morrison, E.D., 8:54329
Furber, C.P., Model railroad industry nuclear emergency response plant, 8:53708 (RA;US)
Furtak, T.E., Photon scattering and interaction analysis for interfacial corrosion and catalysis. Technical progress report, September 1, 1982-August 31, 1983, 8:54048 (R;US)

G

Gablin, K.A., Non-shielded transport package impact response to unyielding and semi-yielding surfaces, 8:54426 (RA;US)
Gadgil, A., *See* Bauman, F., 8:54139
Gadioli, E., Reactions induced on ^{93}Nb by α particles up to 140 MeV, 8:55182 (RA;FR)
Gadioli Erba, E., *See* Gadioli, E., 8:55182
Gaidos, J.A., Status of the HPW nucleon decay detector, 8:54646 (RA;US)
Gaines, I., *See* Cumalat, J., 8:55137
Gaines, L.L., Industrial waste exchange: a mechanism for saving energy and money, 8:54074 (R;US)
Gaisser, T.K., Physics of multiple muons in underground detectors, 8:54654 (RA;US)
Galanti, M., *See* Belli, P., 8:55293
Gale, R., *See* Manahan, S.E., 8:53351
Gallenberger, H., Safe containment of the Niederaichbach Nuclear Power Station (KKN), 8:53993 (RA;US)
Gallup, D.R., Logical framework for identifying equipment important to safety in nuclear power plants, 8:54028 (R;US)
Gan, T.H., *See* Fry, J., 8:54659
See Mason, G.C., 8:53604
Ganley, J.T., *See* Baxter, B.J., 8:53527
Garaude, F., *See* Friart, D., 8:55259
Garbincius, P.H., *See* Cumalat, J., 8:55137
Garde, R., Los Alamos DP West Plutonium Facility decontamination project, 8:53613 (RA;US)
See Harper, J.R., 8:53616
Gardner, J.H., *See* Colombant, D.G., 8:55258
Garland, T.R., Comparative behavior of ^{99}Tc, ^{129}I, ^{127}I and ^{137}Cs in the environment adjacent to a fuels reprocessing facility, 8:54928 (J;GB)
Garner, J.M., *See* Combs, A.B., 8:53615
Garreta, D., *See* Duchazeaubeneix, J.C., 8:54971
Garrett-Price, B.A., *See* Petty, S.E., 8:53763
Garriott, M.L., Neutron and γ-ray effects measured by the micronucleus test, 8:55065 (J;NL)
Garrison, M.E., Method for braze-joining spirally wound tapes to inner walls of heat exchanger tubes, 8:54530 (P;US)
Garrison, R.F., Overview of the US government's nuclear materials shipping program: past, present, future, 8:53516 (RA;US)
See Carlson, K.A., 8:53539
Gartling, D.K., Construction and verification of a finite-element method for nonisothermal flows in porous media, 8:54524 (R;US)
Gates, B.C., Kinetics and mechanism of catalytic hydroprocessing of components of coal-derived liquids. Sixteenth quarterly report, February 16, 1983-May 15, 1983, 8:53366 (R;US)
Gather, K., *See* Althoff, M., 8:55136
Gatti, G., *See* Belli, P., 8:55293
Gaudin, C., *See* de Longueville, Y., 8:54827
See Deneuville, P., 8:54825
Gauthier, M.K., *See* Price, W.E., 8:54759, 8:54760
Gauthier, Y., *See* Van Doren, C., 8:55045
Gavin, M.E., Design of a transportation cask for irradiated CANDU fuel, 8:54430 (RA;US)
Gavrilin, V.A., Graphics display devices for an information measurement system of a research reactor, 8:53936 (R;SU;In Russian)
Gavrilov, V.B., *See* Bayukov, Yu.D., 8:55183
Gazzi, G., *See* Belli, P., 8:55293
Geaga, J., *See* McClelland, J.B., 8:55176
Gearhart, R.A., *See* Cox, B., 8:54716
Gebhard, L.A., *See* Silbernagel, B.G., 8:53376
Gee, G.W., *See* Peterson, S.R., 8:54926
Geffen, C.A., Risk analysis methodologies for the transporatation of radioactive materials, 8:53695 (RA;US)
Geffroy, Transport of fast breeder reactor spent fuel in gas-filled casks, 8:53560 (RA;US)
Geffroy, J.J., *See* Sugier, A., 8:53587
Gehle, R.M., *See* Thoms, R.L., 8:53667
Gehrke, R.J., γ-ray emission probability for the decay of ^{143}Ce, 8:55191 (J;GB)
Geichman, J.R., *See* Combs, A.B., 8:53615
Geipel, H., *See* Maass, K.E., 8:53698
Geiroth, J.A., *See* Moore, K.J., 8:54340
Gentry, P.J., TWIST: a computer program to calculate errors due to degradation of insulation resistance of mineral insulated thermocouple cables, 8:53930 (R;XA)
Geoffroy, G.L., *See* Morrison, E.D., 8:54329
George, A.F., *See* Chivers, T.C., 8:54411
Gerber, R.A., *See* Sweeney, M.A., 8:55296
Gerdin, G.A., Technical progress report on the TFTR alpha extraction and measurement project, 8:55242 (R;US)
Gerdt, V., Phase transitions in the euclidean and hamiltonian approaches in the lattice gauge theories at finite temperature, 8:55158 (R;SU)
Gerdt, V.P., Cubic approximation and local limitations to functional arbitraries in the general solution of Chew-Low equations, 8:55225 (R;SU;In Russian)
Gerhard, M., *See* Woo, H.H., 8:54448
Gerich, C., Scientific program and abstracts, 8:54604 (R;US)
Gerich, J.W., Design and construction of the vacuum vessel for the tandem Mirror Fusion Test Facility, 8:55312 (R;US)
Germer, J.H., Magnetic switch for reactor control rod, 8:53950 (P;US)
Gerstein, M., Liquid phase decomposition: a possible problem with fuels in high pressure systems, 8:54362 (RA;US)
Proceedings of the 1980 Heat Transfer and Fluid Mechanics Institute, 8:54519 (R;US)
Geumlek, J.M., *See* Mulvihill, R.J., 8:53834
Ghassib, H.B., Backflow in two and three dimensions, 8:55121 (R;XA)
Gibbard, B.G., *See* Ahrens, L.A., 8:55127
Gibson, M.O., *See* Goldsmith, W.A., 8:54900
Gibson, M.R., *See* Lee, D.D., 8:53348
Gibson, S.M., *See* Joy, D.S., 8:53581
See Varadarajan, R.V., 8:53641
Gidaspow, D., Fluidization in two-dimensional beds with a jet. 2. Hydrodynamic modeling, 8:54364 (J;US)
Giel, T.V. Jr., *See* Schulz, R.J., 8:54113
Giguere, R.P., Ir spectral signatures of the millrace debris cloud. Technical report, 8:54784 (R;US)
Gilbert, E.R., *See* Johnson, A.B. Jr., 8:53590
Gilbert, K.V., Planning a transportation system for US defense transuranic waste, 8:53554 (RA;US)
Gilbert, R.O., *See* Denahm, D.H., 8:53643
Gilbert, T.L., Alternatives for management of wastes generated by the Formerly Utilized Sites Remedial Action Program, 8:53611 (RA;US)
Quest for ultimate reality and meaning: a scientist's view, 8:54057 (R;US)
Gilchrist, J.P., *See* Barbour, I.M., 8:55146
Giles, G.E., Large climate-moderating envelopes for enclosed structures. A preliminary evaluation of energy-conservation potential, 8:54138 (R;US)

Gill, W., Facility for repeatable fire testing, 8:54439 (RA;US)
See Yoshimura, H.R., 8:54443
Gilles, P., *See* Chevalier, G., 8:54392
See Draulans, J., 8:53569
Gillespie, D., *See* Neely, N., 8:54942
Ginevan, M.E., *See* Carnes, B.A., 8:55333
Ginley, D.S., *See* Baughman, R.J., 8:54285
Ginsberg, T., Model for superheated debris-bed quench for severe-accident containment calculations, 8:53986 (R;US)
Giovanetti, R.C., *See* Shirley, C.G., 8:53571
Gissel, K., *See* Beck, W.L., 8:55032
Giupponi, P., *See* Belli, P., 8:55293
Given, P.H., *See* Davis, A., 8:53399
See Youtcheff, J.S., 8:53342
Gladyshev, A.M., Study of iron self-diffusion in gamma-phase field of iron-chromium binary system, 8:54213 (R;SU;In Russian)
Gladysz, J.A., *See* Kiel, W.A., 8:54323
See Tam, W., 8:54331
Glancy, J., *See* Bernatowicz, H., 8:53719
Glandon, S.A., *See* Fields, D.E., 8:53684
Glanz, J., *See* Motley, R.W., 8:55253
Glanzman, R.K., *See* Rytuba, J.J., 8:53466
Glaser, H., *See* Rittscher, D., 8:53637
Glazer, A.N., *See* Schoenleber, R.W., 8:54328
Gledenov, Yu.M., Study on the $^{22}Na(n,p)^{22}Ne$ reaction at the neutron energy up to 1000 eV, 8:55178 (R;SU;In Russian)
Glenn, R.D., Radiation measurement capability for decontamination to unrestricted use, 8:53628 (RA;US)
Glover, R.L., *See* Hargrove, O.W. Jr, 8:53391, 8:53392
Gobbi, B., Search for right-handed currents in muon decay, 8:55134 (R;US)
Godfrey, B.B., Beam breakup instabilities in high current electron beam racetrack induction accelerators, 8:54573 (R;US)
See Hughes, T.P., 8:54572
Godshalk, G.L., *See* Boon, J.J., 8:54937
Goertz, C.K., *See* Gurnett, D.A., 8:55090
Goetsch, S.D., FFTF disposable solid waste cask: a study in the effectiveness of concrete as a packaging material, 8:54442 (RA;US)
Goff, D.A., *See* Fajer, J., 8:54339
Gohar, Y., US INTOR radiation-shield design, 8:55262 (R;US)
Golchert, H.J., *See* Kasten, F., 8:53757
Goldberg, M., Prospects for Cerenkov ring imaging at hadron colliders, 8:54721 (RA;US)
Goldfinch, E.P., IAEA regulations for the safe transport of radioactive materials: revised A_1 and A_2 values, 8:53480 (RA;US)
Goldman, K., *See* Nolan, D.J., 8:54433
Goldman, M.V., Plasma wave turbulence and particle heating caused by electron beams, radiation, and pinches. Annual interim report 1 Oct 81-30 Sep 82, 8:55097 (R;US)
Goldman, T., Expected mixing angles or is there evidence for horizontal symmetries?, 8:55154 (BA;US)
Goldmann, K., Construction and inservice inspection rules for nuclear spent fuel and high-level waste transport packagings, 8:53568 (RA;US)
See Macek, V.V., 8:54431
Goldsmith, M., *See* Wight, A., 8:53536
Goldsmith, R., Relative and absolute risk in epidemiology and health physics, 8:55023 (RA;US)
Goldsmith, W.A., Radon-222 and progeny measurements in typical east Tennessee residences, 8:54900 (J;GB)
Goldstein, J.C., Evolution of long pulses in a tapered wiggler free-electron laser, 8:54510 (R;US)
Goldstein, S.A., *See* Barker, R.J., 8:55294
Golovatyuk, V.M., *See* Vodop'yanov, A.S., 8:54704
Golovin, V.M., Plastic scintillation monitor for methodical investigation of track detectors on the JINR synchrophasotron, 8:54585 (R;SU;In Russian)
Goodings, A., Wide range in-core neutron measurement system used in the Windscale AGR concluding experiments, 8:53882 (R;XA)
Googe, J.M., *See* Bailey, J.M., 8:55261
Gorchakov, O.E., *See* Alekseev, G.D., 8:55172
Gordon, H.A., Monte Carlo simulation of the effect of pileup, 8:54728 (RA;US)
Gordon, L.L., Discussion of Regulatory Guide 7.10, emphasizing the graded approach for establishing QA programs, 8:54453 (RA;US)
Gordon, R.J., Kinetics of elementary atom and radical reactions. Progress report, 8:55111 (R;US)
Gorin, Yu.P., *See* Antipov, Yu.M., 8:54698
Goringe, M.J., *See* Hascicek, Y.S., 8:54476
Gormley, M., *See* Cumalat, J., 8:55137
Gormley, O.P., Role of dry storage as a means to meet national storage needs in the United States, 8:53597 (BA;XN)
Gornov, M.G., Study on the pion absorption by atomic nuclei by means of multilayer semiconductor spectrometer, 8:55188 (R;SU;In Russian)
Goryainov, N.A., *See* Bayukov, Yu.D., 8:55183
Gotoh, Y., Study of the stochastic point reactor kinetic equation, 8:53920 (RA;JP;In Japanese)
Goure, L., Soviet crisis relocation program. Final report 1 May 82-Jun 83, 8:55346 (R;US)
Gozani, T., *See* Bernatowicz, H., 8:53719
Grachev, A.V., *See* Bondarenko, V.V., 8:53928
Grady, D., Mechanics of fracture under high-rate stress loading, 8:55081 (R;US)
Grady, K.L., Metabolic changes associated with shoot formation in tobacco callus cultures, 8:54968 (R;US)
Grady, L.M., SAFE users manual. Volume 4. Computer programs, 8:53718 (R;US)
Graham, G.H., *See* Oler, J.W., 8:53852
Grahn, D., *See* Collins, J.J., 8:55059
See Garriott, M.L., 8:55065
Grant, A.L., Review of the status of proton decay experiments outside the USA, 8:54649 (RA;US)
Grant, D.M., *See* Alemany, L.B., 8:54334, 8:54335
See Morin, F.G., 8:54327
See Pugmire, R.J., 8:53375
Grant, M.W., *See* Bernhardt, D.E., 8:53632
Grashilin, V.A., Scheme of stepmotor control, 8:54762 (R;SU;In Russian)
Gratton, R., *See* Belli, P., 8:55293
Gravitis, I., Projects GNOME and SEDAN, the PLOWSHARE program. Technical report 1961-1973, 8:54871 (R;US)
Gray, R.J., Metallurgical study of a failed heat exchanger in a H-coal/sup (R)/ pilot plant, 8:53364 (J;US)
Gray, T.A., *See* Rose, J.H., 8:54534
See Thompson, R.B., 8:54535
Gray, W.H., Using PAFEC as a preprocessor for COSMIC/ NASTRAN, 8:55286 (R;US)
See Baudry, T.V., 8:55284
Green, M.A., Forced two-phase cooling of the TPC superconducting solenoid, 8:54477 (R;US)
Greenstadt, E.W., Project to develop an index of pc 3,4,5 geomagnetic pulsations and to study their control by solar wind parameters. Final report, 8:55100 (R;US)
Greer, W.B., *See* Daemen, J.J.K., 8:53657
Gregoire, C., *See* Scheuter, F., 8:55197
Gregory, J.L., *See* Sandusky, W.F., 8:53851
Grella, A.W., Review of selected nuclear transport event case histories, 8:53531 (RA;US)
Grenier, M., *See* Sousselier, Y., 8:53479
Grenier, R., *See* Vigil, M.G., 8:54424
Grenier, R.M., Fatigue design of TRUPACT-1, 8:54446 (RA;US)
See Osborne, D.M., 8:54450
Gres', V.N., *See* Bushnin, Yu.B., 8:54579
Griffith, R.W., *See* Delahoy, A.E., 8:54290
Griffiths, J.C., Effect of fuel gas composition on appliance performance. Topical report Jul 78-Dec 82, 8:53447 (R;US)
Griffiths, M., *See* White, J., 8:54228
Grimm, R.C., *See* Ryu, C.M., 8:55245
Grimshaw, J.A., Ion beam measurements of depth profiles of deuterium concentration in steels. Pt.1: investigation of 18Ni250 high temperature aged martensitic steel, 8:54301 (R;GB)
Ion beam measurements of depth profiles of deuterium concentration in steels. Pt.II: investigation of stainless steel types 304L and EN58E and conclusions of parts I and II, 8:54302 (R;GB)
Grindell, A.G., *See* Sanders, J.P., 8:53906
Grishin, V.G., Analysis of hadron jet behaviour in π^-C interactions at 40 GeV/c, 8:55173 (R;SU;In Russian)
Characteristics of secondary neutrons in the π^-p, π^-n, $\pi^-{}^{12}C$ interactions at P–40 GeV/c, 8:55174 (R;SU;In Russian)
Gritsaj, E.A., *See* Pshenichnyj, V.A., 8:55337
Grogan, D., *See* Ashmore, J.P., 8:55040
Groh, E.F., Improved encapsulated fuel unit and method of forming same, 8:53934 (P;US)
Gronsky, R., *See* Fisher, R.M., 8:54766
Gross, S.B., *See* Sandusky, H.W., 8:54851
Grothus, M.A., Transient response of circular-foil heat-flux gages, 8:54768 (R;US)
Grotz, G.F., High-voltage R-F feedthrough bushing, 8:55322 (P;US)

Gruellich, A., Calibration of a special emergency neutron dosemeter based on organic solid-state track detectors, 8:55214 (R;DD;In German)
See Doerschel, B., 8:54736
See Streubel, G., 8:54737
Grun, J., Experimental methods for studying the Rayleigh-Taylor instability of ablatively accelerated targets. Memorandum report, 8:55257 (R;US)
See Ripin, B.H., 8:55254
See Stamper, J.A., 8:55256
Grundl, J.A., *See* Schwartz, R.B., 8:55212
Gualdrini, G.F., Criticality safety analysis of transport packages for fissile materials and transport index evaluation, 8:54458 (RA;US)
Guarr, T., Quantum effects of high-frequency modes in inorganic electron transfer: kinetic isotope effects in redox reactions of $[Fe(H_2O)_6]^{2+}$, $[Fe(D_2O)_6]^{2+}$, and $Fe[(^{18}OH_2)_6]^{2+}$, 8:54310 (J;US)
Gubrienko, K.I., *See* Bryukhanov, N.S., 8:54684
Guerra, V.G., *See* Macek, V.V., 8:54431
Guin, J.A., *See* Curtis, C.W., 8:53345
See Tarrer, A.R., 8:53338, 8:53339, 8:53340, 8:53341, 8:53343
Guinan, M.W., *See* Hahn, P., 8:55282
Gumahad, A.T. II, Characterization of laser beam quality. Master's thesis, 8:54495 (R;US)
Gumbel, H., *See* Reese, J. Jr., 8:53819
Gupta, V.P., Response of an area albedo neutron dosimeter, 8:54746 (J;GB)
Gureghian, A.B., Performance assessment of a shaft seals system in a HLW repository in the Gibson Dome area, 8:53673 (R;US)
Gurnett, D.A., Electron acceleration by Landau resonance with whistler mode wave packets. Progress report, 8:55098 (R;US)
Ion cyclotron waves in the Io plasma torus: polarization reversal of whistler mode noise. Revision. Progess report, 8:55090 (R;US)
See Reinleitner, L.A., 8:55091
Gustafsson, B., Realization of a sea transport system for radioactive material, 8:53559 (RA;US)
Guthrie, R.J., Electrically insulating and sealing frame, 8:54122 (P;US)
Guy, A.W., *See* Chou, C., 8:55073
Guy, L.R., *See* Thivet, R., 8:54796
Gwyther, J.R., Fundamental studies of the ionic contamination of painted surfaces, 8:53712 (RA;US)
Gyulassy, M., Quark-gluon plasma formation, 8:55152 (R;US)

H

Haaker, C.K., RAMPAC: a database of certified packaging for radioactive materials, 8:53546 (RA;US)
Hackney, S.A., In-situ oxidation studies of vanadium-20% titanium alloy, 8:54223 (RA;US)
Hadley, D.L., *See* Sandusky, W.F., 8:53851
Haeffele, B., *See* Sentman, L.H., 8:54840
Hagan, J.T., Low energy laser initiation of single crystals of β-lead azide, 8:54841 (RA;US)
Hagan, W., *See* Bernatowicz, H., 8:53719
Hahn, P., Spallation and 14-MeV neutron irradiation of stabilized NbTi superconductors, 8:55282 (R;US)
Haidt, D., Neutrino physics, 8:55128 (RA;XC)
Haighton, A.P., *See* Gwyther, J.R., 8:53712
Hakonson, T.E., *See* Markham, O.D., 8:54930
Halama, H.J., AGS polarized proton project, 8:54597 (R;US)
Halbach, K., Conceptual design of a permanent quadrupole magnet with adjustable strength, 8:54625 (J;NL)
Permanent-magnet multipole with adjustable strength, 8:54629 (P;US)
Halbert, M.L., *See* Jaeaeskelaeinen, M., 8:55192
Hale, G., *See* Cox, B., 8:54716, 8:54719
Hall, E.P., *See* Belefski, M.L., 8:54958
Hall, G.G., *See* Erickson, B.H., 8:55053
Hall, J.A., Energy recovery from natural-gas pressure-regulator stations, 8:53446 (R;US)
Hall, M.C.G., Cross-section adjustment with Monte Carlo sensitivities: Application to the Winfrith iron benchmark, 8:53927 (J;US)
Hall, M.S., Numerical solution to the Stokes equations for flow past two spheres and a chain of particles attached to a sphere, with an application to filter clogging, 8:55122 (R;US)
Hall, R.E., *See* Coppola, A., 8:53429
Halpin, V.L., *See* Meyer, D.E., 8:55344
Hamard, J., Study of the exposures received by the persons involved in the transportation of radioactive materials, 8:53700 (RA;US)
Hamasaki, S., Classical theory of the bumpy torus relativistic annulus, 8:55317 (J;AT)
Hamel, W.R., Method and apparatus for determining fluid mass flowrates, 8:54774 (P;US)
Hamid, A., Locomotive data acquisition package. Volume 5. Locomotive Analysis Software Package: user's guide. Final report Apr 81-Jan 82, 8:54153 (R;US)
Hamilton, L.D., *See* Moskowitz, P.D., 8:53788
Hamm, R.N., *See* Todo, A.S., 8:55206
Hamman, J.P., *See* Seliger, H.H., 8:54342
Han, A., *See* Suzuki, F., 8:55052
Hancock, R., *See* Gwyther, J.R., 8:53712
Hane, G.J., Innovative industrial-materials processes, 8:54175 (R;US)
Hanitsch, R., Pilot test facility. phase I. Final report, 8:53805 (R;US)
Hankinson, J., *See* Petsonk, L., 8:54975
Hankinson, J.L., Image analysis of chest radiographs. Final report, 8:54976 (R;US)
Hannett, B., *See* Mangusi, J., 8:53566
Hansen, L.J., *See* Hunt, A.J., 8:53826
Hansen, O., Inelastic scattering of ^{16}O from ^{60}Ni at 114 MeV, 8:55181 (J;NL)
Hanson, A.L., *See* Isaacs, H.S., 8:54208
Hanson, G.G., Tau and B lifetime measurements from the MARK II, 8:55142 (R;US)
Hanson, L.K., *See* Fajer, J., 8:54339
Hardarson, G., Nitrogen fixation by tree crops, 8:54990 (RA;XA)
Hardee, H.C., Down-hole periodic seismic generator, 8:54782 (P;US)
Hardin, E.C. Jr., *See* Carlson, K.A., 8:53539
Harding, D., *See* Cumalat, J., 8:55137
Harding, L.B., Theoretical studies of the potential surface for the reaction $C(^3P) + H_2 \rightarrow CH_2(^3B_1)$, 8:54365 (J;US)
Hardis, J., *See* Berry, H.G., 8:55108
Hardy, J.T., Bioaccumulation kinetics and organ distribution of nickel in the marine clam (Protothaca staminea), 8:54949 (J;US)
Hargrave, N.J., Correction for the effect of humidity in free air ionisation chambers for x-rays other than those generated at 50 kV, 8:54661 (RA;AU)
Determination of factors for the conversion of exposure to absorbed dose to water for x-rays less than 150 kV., 8:55208 (RA;AU)
See Allen, P.D., 8:54662
Hargrove, O.W. Jr, Full-scale utility FGD (flue gas desulfurization) system adipic acid demonstration program. Volume 1. Process results. Final report Jun 80-Nov 82, 8:53391 (R;US)
Full-scale utility FGD (flue gas desulfurization) system adipic acid demonstration program. Volume 2. Continuous emissions monitoring results. Final report Jun 80-Nov 82, 8:53392 (R;US)
Harlan, R., *See* Bernatowicz, H., 8:53719
Harley, N.H., Skin dose and response for the head and neck in patients irradiated with x-ray for tinea capitis: implications for environmental radioactivity, 8:55012 (RA;US)
Harnby, N., *See* Burnet, G., 8:53387
Harper, A.M., *See* Meuzelaar, H.L.C., 8:53359
Harper, J.R., Decommissioning of a tritium contaminated laboratory, 8:53616 (RA;US)
Harrington, R.M., Effect of small-capacity, high-pressure injection systems on TQUV sequences at Browns Ferry Unit One, 8:54029 (R;US)
Harris, A.M., Fuel failure detection and location methods in CAGRs, 8:53889 (R;XA)
Harris, J.W., *See* Renfordt, R.E., 8:55194
Harris, S.E., Research studies on radiative collisional processes. Final report, 1 October 1979-30 September 1982, 8:54498 (R;US)
Harrison, D.J., *See* Bagilo, J.A., 8:53784
Harrison, F.L., Kinds and quantities of organic combustion products in solid and liquid wastes from a coal-fired power station, 8:53393 (R;US)
Harrison, W.E., In-core flow measurement and calibration of gags using on-load instrumented stringers in a C.A.G.R. at Hinkley Point 'B', 8:53931 (R;XA)
Tar sand resource appraisal in south-central Oklahoma, 8:53454 (RA;US)
Harshbarger, E.D., *See* Bohac, C.E., 8:53756
Hartill, D., Tracking detectors, 8:54708 (RA;US)

Hartman, F.C., *See* Cook, C.M., 8:54962
Harvey, K.L., *See* Sheeley, N.R. Jr, 8:55088
Harvey, R.S., *See* Fliermans, C.B., 8:55070
Hascicek, Y.S., HVEM study of Nb_3Sn multifilamentary superconducting wires, 8:54476 (RA;US)
Hasegawa, K., *See* Maki, Y., 8:54459
Hashikura, H., Measurements of neutron and gamma ray streaming through a duct, (2), (3), 8:53976 (R;JP;In Japanese)
Hassan, H.F., *See* El Nadi, A.M., 8:55240
Hassan, M.Y.M., Binding energy calculations using the molecular orbital wave function, 8:55167 (R;XA)
Hastings, J.M., *See* Zhuang, J., 8:54241
Hastings, L., Tarco semi-commercial solvent extraction of tar sands, 8:53456 (RA;US)
Hatt, D.J., *See* Chick, M.C., 8:54815
Hattula, J., *See* Jaeaeskelaeinen, M., 8:55192
Hauenstein, D., *See* Neckers, D.C., 8:53740
Hauser, S.G., Experimental results and operational characteristics of heat exchangers in dry/wet operations, 8:54523 (R;US)
See Hane, G.J., 8:54175
Haverkamp, J., *See* Vanderborgh, N.E., 8:53353
Hawkesford, M.J., Electron transfer around photosystem I in cyanobacterial heterocyst membranes, 8:54966 (R;US)
Hawkins, S.J., *See* Burton, J.T.A., 8:54844
Hawley, P., *See* DeCarlo, R., 8:53855
Haxton, W.C., *See* Cowan, G.A., 8:55093
Hay, J.E., *See* Mohan, V.K., 8:54817
Hayashi, K., *See* Kinoshita, C., 8:54259
Hayashi, M., *See* Shiroya, S., 8:53964
Hayatsu, R., *See* Winans, R.E., 8:53378
Hayes, J.V., *See* Raynor, G.S., 8:54895
Hayes, K., *See* Chauvat, P., 8:54713
Hays, D.D., *See* Pawlewicz, W.T., 8:54262
Haywood, F.F., *See* Glenn, R.D., 8:53628
Healy, F., *See* Sapienza, R.S., 8:53412
Hearn, W.E., Precision absolute-value amplifier for a precision voltmeter, 8:54773 (P;US)
Heck, G.M., *See* Andreas, R.D., 8:53436
Hecker, R., *See* Benninghofen, G., 8:53886
Hedrich, E., *See* Irlweck, K., 8:55083
Heemstra, R.J., *See* Pecina, R.J., 8:53431
Heffernan, D.M., *See* Liboff, R.L., 8:54506
Hein, D., Investigtion of the system behaviour of a pressurised-water reactor in loss-of-coolant accidents: the PKL experiment, 8:54040 (TJ;GB)
Heineman, H., *See* Delanny, F., 8:53358
Heit, M., *See* Klusek, C.S., 8:54888
Heitner, K.L., Industrial waste heat for district heating, 8:54075 (J;US)
Hejna, J., Experimental investigation of local hydrodynamic characteristics of the peripheral area of a fast reactor fuel assembly. 2. Results of measurements at rated geometry, 8:53903 (R;CS;In Russian)
Heki, H., *See* Sekiguchi, N., 8:53902
Held, M., Inverse multi-streak-technique, 8:54843 (RA;US)
Heller, E.J., Quantum correspondence to classical chaos, 8:55229 (J;NL)
Heller, K., *See* Bartelt, J., 8:55124
Hellstrom, I., *See* Chou, C., 8:55073
Hellstrom, K.E., *See* Chou, C., 8:55073
Helms, R., *See* Aurich, D., 8:54380
Hemsing, W.F., VISAR: some things you should know, 8:54763 (R;US)
Henager, C.H., Engineering factors influencing Corbicula fouling in nuclear-service water systems, 8:53869 (R;US)
Hendi, A., *See* El Wakil, S.A., 8:55204
Hendrie, J.M., Nuclear power plants: structure and function, 8:53867 (R;US)
Henniger, J., Calculation of the neutron sensitivity of thermoluminescent detectors. 1. Fundamentals, 8:54738 (R;DD;In German)
Calculation of the neutron sensitivity of thermoluminescent detectors. 3. Sensitivity of radiator-detector combinations for fast neutrons, 8:54740 (R;DD;In German)
Calculation of fusion cross sections, 8:55175 (R;DD;In German)
See Fellinger, J., 8:54735
See Huebner, K., 8:54739
Henning, W., High-sensitivity mass spectrometry with a tandem accelerator, 8:54603 (R;US)
Henrich, V.E., Role of d-electrons in chemisorption and metal/support interactions studied by electron spectroscopy. Progress report, January 15, 1983-January 14, 1984, 8:55112 (R;US)
Henry, B.E., *See* Yarborough, R.D., 8:53526
Hensley, D.C., *See* Jaeaeskelaeinen, M., 8:55192
Herbelin, J.M., *See* Durran, D.A., 8:54494
Herberholz, K., Operational experience in loading spent fuel casks in European LWRs, 8:53505 (RA;US)
Herbert, D.E., Model or metaphor. More comments on the BEIR III report, 8:55028 (RA;US)
Herbst, M.J., *See* Grun, J., 8:55257
See Ripin, B.H., 8:55254
Herkommer, E., *See* Alter, U., 8:53717
Hermann, O.W., *See* Parks, C.V., 8:54461
Hermetz, R.E., Use of urethane foam in the decontamination and decommissioning of nuclear facilities, 8:53622 (RA;US)
Herrera, J., Magnetic field measurements of superconducting magnets for the colliding beam accelerator, 8:54632 (R;US)
See Engelmann, R., 8:54576
Herrmannsfeldt, W.B., New heavy-ion-fusion accelerator research program, 8:55306 (R;US)
Hershkowitz, J., Deflagration from an ignition site of a confined explosive charge as a function of venting by orifice flow, 8:54802 (RA;US)
See Myers, T.F., 8:54855
See Velicky, R.W., 8:54853
Herzenberg, C.L., *See* Pecina, R.J., 8:53431
Herzog, W., Acoustic system for pipe rupture monitoring and leak detection, 8:53938 (R;XA)
Hess, E., Decommissioning study for the Beznau nuclear power plant (2 x 350 MW): the Swiss approach, 8:54011 (RA;US)
Hickman, R.B., *See* Hoard, R.W., 8:55310
Hida, Y., *See* Nishino, S., 8:54541
Hiddleston, H.R., *See* Segall, S.B., 8:54500
Higashi, K., *See* Yokoyama, H., 8:54418
Higgins, E.C., Fuel cells for power plants, 8:54118 (RA;US)
Hikichi, T., *See* Miyazawa, T., 8:53977
See Tamura, S., 8:53971
Hill, C.K., *See* Suzuki, F., 8:55052
Hill, K.W., *See* Bitter, M., 8:55246
Hill, R.A., Variable aperture neutron collimator, 8:54626 (J;NL)
Hill-Livense, M.E., *See* Peppas, N.A., 8:53369
Hillis, D.L., Enhanced test facility for OTEC at Keahole Point, 8:53794 (R;US)
Hills, R.G., *See* Grothus, M.A., 8:54768
See Hardee, H.C., 8:54782
Hind, G., *See* Hawkesford, M.J., 8:54966
Hinds, W.T., Detecting long-term ecological effects in forests and food chains, 8:54911 (R;US)
Hines, A.P., *See* Bennett, B.I., 8:54904
Hinkle, B.K., *See* Lang, K., 8:54180, 8:54181
Hinks, D., *See* Shenoy, G.K., 8:54288
Hirabayashi, M., *See* Hiraga, K., 8:54279
Hiraga, K., In-situ high resolution observation of electron irradiation defects in Si, 8:54279 (RA;US)
Hirao, K., *See* Kodaira, K., 8:53970
Hirata, M., Formation of point defect clusters in electron irradiated germanium, 8:54230 (RA;US)
Hiromoto, G., *See* Todo, A.S., 8:55206
Hirschfeld, T.B., Pressure-sensitive optrode, 8:54776 (P;US)
Hitchon, J.W., Radiation stability of plastics and rubbers, 8:54267 (R;GB)
Hittle, D.C., Analysis of energy conservation alternatives for standard Army building. Final report, 8:54128 (R;US)
Hitzman, C., *See* Cumalat, J., 8:55137
Ho, C.Y., *See* Desai, P.D., 8:54207
Ho, T., *See* Fan, L.T., 8:54526
Hoard, R.W., Advanced high-field coil designs: 20 TESLA, 8:55310 (R;US)
Hobart, D.E., *See* Madic, C., 8:54350
Hobbs, B.F., *See* Schuler, R.E., 8:54106
Hobbs, R.H., *See* Michels, H.H., 8:55104
Hodous, T., *See* Petsonk, L., 8:54975
Hoenes, G.R., *See* Denahm, D.H., 8:53643
Hoffer, P.B., *See* Weiner, R.E., 8:54347
Hoffman, J.M., *See* Sweeney, M.A., 8:55296
Hoffman, L., Engineering/economic analysis of coal preparation with flue gas desulfurization for keeping higher sulfur coals in the energy market, 8:53384 (R;US)
Hoffman, T.J., Evaluation and modification of the probability table method for bubble reactivity worth calculations, 8:53923 (J;US)
See Parks, C.V., 8:54461
Hoffmann, R., *See* Schuch, R., 8:55105
Hofland, R., *See* Amimoto, S.T., 8:54505
Hogan, J.J., *See* Gadioli, E., 8:55182
Hogg, R., *See* Rey, P.A., 8:53390
Hohmuth, K., Joint annual report 1981, 8:55164 (R;DD;In German)
Hohorst, F.A., *See* Burr, J.R., 8:53648
See Fernandez, S.J., 8:53647
Holder, R.R., Commercial energy costs for SOLCOST data bank cities, Winter 1982-1983, 8:54105 (R;US)
Holland, M.K., *See* McGonnagle, W.J., 8:54731
Holman, G.S., *See* Scholl, K.H., 8:54039

Holmgren, P.M., *See* Kaerker, S., 8:53996
Holzinger, R., *See* Segall, S.B., 8:54500
Holt, E.C. Jr., *See* Barrett, R.E., 8:53861
See Killmeyer, R.P. Jr., 8:53419
Holt, P.J., *See* Blythe, R.A., 8:54425
Holter, G.M., *See* Murphy, E.S., 8:54013
Holton, J.K., *See* Pansky, S.H., 8:54145
Holyoak, B., Proposed UK legislation to provide radiological protection for workers, with emphasis on its application to the transport of radioactive materials, 8:53511 (RA;US)
See Shaw, K.B., 8:53701
Holzloehner, U., *See* Wieser, K.E., 8:54423
Homan, F.J., Post-irradiation characterization and performance assessment of coated particle fuels, 8:53892 (BA;GB)
Honerkamp, R.L., Fugitive emission testing at the Kosovo coal gasification plant. Final task report Apr 79-Sep 81, 8:53349 (R;US)
Hongo, T., Manufacture of mirrors by NC machining of EEM, 8:54473 (RA;JP;In Japanese)
Honodel, C.A., Shock initiation of TATB formulations, 8:54819 (RA;US)
Hooker, D.R., *See* Peppas, N.A., 8:53369
Hoots, S.S., Glow-curve analysis for verification of dose in LiF chips, 8:54749 (J;GB)
Hoover, M.D., Aerosols from metal cutting techniques typical of decommissioning nuclear facilities - inhalation hazards and worker protection, 8:53690 (RA;US)
See Newton, G.J., 8:53691
Hope, E., *See* Bernatowicz, H., 8:53719
Hopkins, G.R., Low-activation fusion-reactor design studies, 8:55291 (R;US)
See Cheng, E.T., 8:55289
Hoppe, D.J., *See* Vernon, R.J., 8:55264
Hopper, G., *See* Burton, J.T.A., 8:54844
Hopper, R.W., *See* Klages, M.G., 8:54916
Horai, M., *See* Onimura, K., 8:54540
Hori, T., *See* Nakanishi, T., 8:54581
Horigome, T., *See* Sakai, K., 8:54546
Horikoshi, G., *See* Ishimaru, H., 8:54641
Horlbeck, B., *See* Henniger, J., 8:55175
Horne, F.H., *See* Bradley, D.J., 8:54247
Hornstra, F., *See* DeLuca, W.H., 8:54046
See Miller, J.F., 8:54047
Horton, W., *See* Bernatowicz, H., 8:53719
Horton, W.J., *See* Morin, F.G., 8:54327
Horwitz, E.P., *See* Dyrkacz, G.R., 8:53374
Hoshino, H., *See* Hongo, T., 8:54473
Hoskin, N.E., Acceleration of two metal plates in an He-metal sandwich, 8:54848 (RA;US)
Hosoda, M., *See* Fujita, Y., 8:54685, 8:54688
Hosokawa, T., Eddy-current-inspection method for ferromagnetic transfer tubes: first report, 8:54545 (TJ;US)
Houchins, J.P., *See* Hawkesford, M.J., 8:54966
Housholder, W.R., Design of new overpacks for UF_6 cylinders, 8:54399 (RA;US)
Howard, D.R., *See* Lancaster, H.D., 8:54628
Howard, J.J., *See* Meyer, D., 8:53672
Howard, W.A., *See* Hsu, T.B., 8:54336
Howe, P.M., Numerical study of detonation propagation between munitions, 8:54866 (RA;US)
Response of confined explosive charges to fragment attack, 8:54865 (RA;US)
Howell, R.H., Production of slow positrons beams with an electron linac, 8:54630 (BA;NL)
Howitt, D.G., *See* DeNatale, J.F., 8:54280
Howland, J.W., Reduction of land recontouring costs. Volume I. Texas lignite field. Open file report Sep 78-Jan 81, 8:53395 (R;US)
Reduction of land recontouring costs. Volume II. bituminous coal field, northeast Arizona. Open file report Feb 79-Jun 82, 8:53396 (R;US)
Hsiao, M.Y., Velocity-space particle loss in field-reversed theta pinches, 8:55243 (R;US)
Hsie, A.W., *See* Tindall, K.R., 8:55039
Hsu, C.J., *See* Kroeger, P.G., 8:53985
Hsu, D.K., Ultrasonic 3-D reconstruction of inclusions in solids using the inverse Born algorithm, 8:54533 (R;US)
Hsu, T.B., Effects of porosity and surface area of octadecyl-derivatized silica on fractionations of oligomers of 800 MW polystyrene, 8:54336 (J;US)
Hu, P.N., Fast reconnection of magnetic fields in a plasma, 8:55287 (R;US)
Huang, Y.K., *See* Howe, P.M., 8:54866
Huba, J.D., *See* Smith, R.A., 8:54870
Hubbard, D.A., *See* Bostwick, L.E., 8:53335
Hubbard, P.J., *See* Dyer, A.S., 8:54864
Hubbell, H.H. Jr., *See* Painter, L.R., 8:55114
Huber, B., Overview of decommissioning research and development activities in the European Community, 8:53997 (RA;US)
Hubert, P., Cost effectiveness of safety measures applying to natural uranium hexafluoride transportation in France, 8:53694 (RA;US)
Hucko, R.E., *See* Killmeyer, R.P. Jr., 8:53419
Hudgins, H.E., *See* Hershkowitz, J., 8:54802
Hudson, D.H., Considerations in using radiation dosimetry data in epidemiologic studies, 8:55018 (RA;US)
Huebner, H.W., Interactions between crush conditions and fire resistance for Type B packages less than 500 kg, 8:54390 (RA;US)
See Droste, B., 8:54385, 8:54434
See Maass, K.E., 8:53698
Huebner, K., Calculation of the neutron sensitivity of thermoluminescent detectors. 2. Relative light conversion ratio for various thermoluminescent detectors as a function of the LET, 8:54739 (R;DD;In German)
See Fellinger, J., 8:54735
See Henniger, J., 8:54738, 8:54740, 8:55175
Hueggenberg, R., *See* Lauer, H., 8:53494
Huerta, M., *See* Sutherland, S.H., 8:54427, 8:54449
Huesman, R.H., *See* Derenzo, S.E., 8:54752
Hughes, T.P., High current betatron stability and injection studies, 8:54572 (R;US)
See Adler, R.J., 8:54570
See Godfrey, B.B., 8:54573
Hulburt, C.W., Summary of SHERWOOD activities, 8:55233 (R;US)
Hull, A.B., *See* Hull, J.R., 8:54125
Hull, J.R., Energy storage criteria handbook. Final report mar 81-jun 82, 8:54125 (R;US)
Gradient zone-boundary control in salt-gradient solar ponds, 8:53827 (P;US)
Hulstrom, R.L., *See* Riordan, C.J., 8:53759
Hummel, D.J., Problems involved in the computer identification of replicate entries in TOXLINE, 8:55330 (R;US)
Humphrey, J.R., *See* Honodel, C.A., 8:54819
Humphrey, M.B., *See* Schultz, A.J., 8:54318
Humphreys, D.R., High-voltage supply for neutron tubes in well-logging applications, 8:54783 (P;US)
Hunt, A.J., Carbon-particle generator, 8:53828 (P;US)
Solar heat receiver, 8:53826 (P;US)
Hunt, A.L., *See* Calderon, M.O., 8:55311
Hunter, K.C., *See* Robbins, C.L., 8:53758
Hunter, R.B., Nitrate distribution in Mojave Desert soils, 8:54914 (J;US)
Hunter, S.R., *See* Carter, J.G., 8:54550
Huntley, R.B., Microcalorimetric standard of absorbed dose, 8:54663 (RA;AU)
Hurley, J.D., *See* Gilbert, K.V., 8:53554
Hurme, A.K., *See* Ford, J.C., 8:54939
Hussey, M.W., Operation and maintenance of the T-3 cask system, 8:54420 (RA;US)
Hutter, A.C., *See* Aguilar, F., 8:53926
Huxley, P.A., Woody plants and land use, 8:54984 (RA;XA)
See Omoti, U., 8:54996

I

Icerman, L., *See* Whittier, J., 8:53840
Iddings, F.A., Feasibility of development of a nuclear density gage for determining the density of plastic concrete at a particular stratum. Final report July 77-May 81, 8:54732 (R;US)
Igata, N., Influence of nitrogen and carbon on void swelling in 316 stainless steel in-situ observed by a HVEM, 8:54232 (RA;US)
See Kohyama, A., 8:54231
Igel, E.A., *See* Stanton, P.L., 8:54852
Igo, G., *See* McClelland, J.B., 8:55176
Iguchi, T., *See* Maki, Y., 8:54459
See Miyaguchi, K., 8:53973
Iida, H., Parametric study of LH current drive for FED-A, 8:55237 (R;US)
Iizumi, M., Structure of magnetite (Fe_3O_4) below the Verwey transition temperature, 8:54263 (J;DK)
Il'yashenko, A.S., *See* Begichev, S.N., 8:53965
Ilari, O., *See* Maestas, E., 8:53607
Im, B.J., *See* Oler, J.W., 8:53852
Imamura, M., *See* Fujita, Y., 8:54689
Imanishi, A., *See* Naito, F., 8:54686
Incropera, F.P., *See* Anderson, D.W., 8:53370
Ingwersen, H., *See* Schuch, R., 8:55105
Ino, H., *See* Onodera, A., 8:54463
Inoue, M., *See* Maki, Y., 8:54459

Inoue, T., Field in situ vibration testing of JOYO heat transport system piping, 8:53974 (R;JP)
See Nakano, M., 8:53969
Intemann, P.R., Two types of values and their assessment by the collective interest, 8:54059 (R;US)
Inuzima, H., *See* Araki, H., 8:53946
Irie, Y., BSF beam line, 8:54588 (R;JP)
Irlweck, K., Dating of lake sediments by determination of the polonium-210 (lead-210) content, 8:55083 (R;AT;In German)
Isaacs, H.S., Characterization of Alloy 600 surfaces after exposure to a caustic environment, 8:54208 (R;US)
Isaev, A.N., *See* Bushnin, Yu.B., 8:54679
Isaev, A.S., *See* Zabolotin, V.P., 8:54584
Ishii, T., *See* Naito, F., 8:54686
Ishimaru, H., Vacuum system of TRISTAN electron ring, 8:54641 (RA;JP;In Japanese)
Ishiyama, S., *See* Miyakawa, S., 8:53972
Ishmukhametov, M.Z., *See* Vagov, V.A., 8:53940
Ismail, E.H., *See* Hassan, M.Y.M., 8:55167
Isoard, P., *See* Van Doren, C., 8:55045
Ito, Y., *See* Nakano, M., 8:53969
Ivanov, V.B., *See* Basova, B.G., 8:53967
Iyengar, G.V., Elemental composition of human and animal milk. A review. A report prepared under the auspices of the IAEA in collaboration with the WHO, 8:54983 (R;XA)
Izatt, R.M., *See* Christensen, J.J., 8:54292

J

Jablon, S., Follow-up studies on A-bomb survivors: implications for radiological protection, 8:55016 (RA;US)
Jacak, B.V., *See* Gadioli, E., 8:55182
Jackson, D.R., Passive solar-heating retrofit of a maintenance facility: first-year performance. Research report may 81-jun 82, 8:53804 (R;US)
Jacobs, K.E., *See* Walburg, C.H., 8:53755
Jacobs, S.J., *See* Coffey, C.S., 8:54859
Jacobs, V.L., Dielectronic recombination rates, ionization equilibrium, and radiative emission rates for MN ions in low-density high-temperature plasmas. Memorandum report, 8:55103 (R;US)
Jacobson, R.A., *See* Neckers, D.C., 8:53740
Jaeaeskelaeinen, M., Evolution of nuclear shapes in $^{157-161}$Yb as a function of spin and neutron number, 8:55192 (J;NL)
Jais, M., *See* Wieser, K.E., 8:54423
James, D.R., *See* Christophorou, L.G., 8:55109
James, H.M., *See* Desai, P.D., 8:54207
Jamison, J.D., *See* Denahm, D.H., 8:53643
Janberg, K., *See* Lauer, H., 8:53494
Janowicz, A.H., Activation of C-H bonds in saturated hydrocarbons on photolysis of (eta^5-C_5Me_5)(PMe_3)IrH_2. Relative rates of reaction of the intermediate with different types of C-H bonds and functionalization of the metal-bound alkyl groups, 8:54326 (J;US)
Janzen, G., *See* Thumm, M., 8:55276
Jaquish, R.E., *See* Denahm, D.H., 8:53643
Jastrow, J.D., *See* Tobin, R.L., 8:53859
Jauch, W., Workshop on instrumentation of the disassembled BER II, 8:53983 (R;DE;In German)
Javed, M., *See* Mubarak, M.A., 8:55213
Jayaraman, S., *See* Pollack, R.W., 8:55056
Jefferson, R.M., Regulation versus reality, 8:53578 (RA;US)
Transporting spent reactor fuel: allegations and responses, 8:53582 (R;US)
See Gablin, K.A., 8:54426
See Kikuchi, S., 8:53509
Jenkins, J.C., *See* Rice, R.W., 8:53443
Jenne, E.A., *See* Krupka, K.M., 8:53675
Jensen, R.C., Instrumented shotgun facility to study impact initiated explosive reactions, 8:54810 (RA;US)
Jerberyd, L., *See* Persson, A., 8:54790
Jewell, S.R., National Environmental Research Areas: FOCI for integrated research in western energy resource regions. A feasibility study report, 8:53394 (R;US)
Jing, F.Q., *See* Tan, B.S., 8:54849
Jinglit, M., Development of an analytical technique for the determination of traces of mercury by substoichiometric isotope dilution method, 8:54296 (R;TH)
Joeres, E.F., Buying a better environment: cost-effective regulation through permit trading. Technical report, 8:54061 (R;US)
Johanson, N.W., *See* Romesberg, L.E., 8:54400
Johnson, A.B. Jr., Spent fuel behavior in dry storage, 8:53590 (BA;XN)
Johnson, A.G., *See* Dodd, B., 8:53995
Johnson, B.M., *See* Hauser, S.G., 8:54523
See Schuch, R., 8:55105
Johnson, D.J., *See* Burns, E.J.T., 8:55300
See Dreike, P.L., 8:55299
See Olsen, J.N., 8:55302
See Sweeney, M.A., 8:55296
Johnson, D.W., Combined effects of atmospheric deposition, internal acid production, and harvesting on nutrient gains and losses from forest ecosystems, 8:54909 (R;US)
See Campbell, D.K., 8:53839
Johnson, E.L., Development of a solar-energy system. First annual report, 8:53770 (R;US)
Johnson, E.R., Technical and economic assessment of alternative dry storage methods, 8:53598 (BA;XN)
Johnson, J.E., WIPP design flexibility for defense TRU waste transportation systems interface, 8:53504 (RA;US)
Johnson, K.I., *See* Henager, C.H., 8:53869
Johnson, K.R., *See* Richards, L.W., 8:54884
Johnson, L.R., *See* McEvilly, T.V., 8:54873
Johnson, P.E., *See* Joy, D.S., 8:53528, 8:53579, 8:53581
Johnson, R.A., *See* Gordon, H.A., 8:54728
Johnson, R.M., *See* Byrne, D.P., 8:54553
Johnson, S.M., Role of microstructural inhomogeneities on high-temperature failure in ceramics, 8:54257 (R;US)
Johnston, P.N., *See* Burns, P.A., 8:54665
See Moroney, J.R., 8:55210
Jolly, W.L., *See* Beach, D.B., 8:54309
Jonas, H., *See* Herzog, W., 8:53938
Jones, C.C., *See* Chou, C., 8:55073
Jones, C.E.R., *See* Vanderborgh, N.E., 8:53353
Jones, D.A., *See* Giguere, R.P., 8:54784
Jones, E.C. Jr., *See* Stolovy, A., 8:54791
Jones, G.J., *See* Bonk, G.J., 8:53761
Jones, H.D., Theoretical EOS for reaction products of RDX, 8:54839 (RA;US)
Jones, J.W., *See* McConnell, P., 8:54428
Jones, K.W., *See* Schuch, R., 8:55105
Jones, L.W., Scintillation chamber of calorimeters for colliding beam detectors, 8:54715 (RA;US)
Jones, M.V., *See* Hoffman, L., 8:53384
Jones, R.H., Method of determination of A_S for a mixture of radionuclides, 8:53499 (RA;US)
Jones, T.W., Nuclear reinteraction effects, 8:55126 (RA;US)
Jones, W.B., *See* Liu, Y.S., 8:54496
Jordan, G.W., Electrical conductivities of polycrystalline and single-crystal Er_2O_3-stabilized hafnia, 8:54256 (R;US)
Jory, H., CW waterload, etc., 8:55274 (RA;US)
Joseph, B.J., Design and testing of scale model transport systems, 8:53552 (RA;US)
See Gablin, K.A., 8:54426
Joshi, J.B., Effect of pH on the removal of pyritic sulfur from coal by oxydesulfurization, 8:53416 (RA;US)
Kinetics of organic sulfur removal from coal by oxydesulfurization, 8:53417 (RA;US)
Particle size effects in oxidation of pyrite in air/water chemical coal cleaning, 8:53415 (RA;US)
Jouan, A., *See* Bonniaud, R., 8:53605
Joy, D.S., DOE transportation programs: computerized techniques, 8:53579 (RA;US)
HIGHWAY, a transportation routing model: program description and users' manual, 8:53581 (R;US)
US Department of Energy sponsored techniques for computerzed transportation routing analysis, 8:53528 (RA;US)
See Peterson, R.W., 8:53555
See Schneringer, P.E., 8:54445
See Varadarajan, R.V., 8:53641
See Wilmot, E.L., 8:53487
Joy, R.W., Parasitic corrosion-resistant anode for use in metal/air or metal/O_2 cells, 8:54052 (P;US)
Rapidly refuelable fuel cell, 8:54123 (P;US)
Joyce, G., Numerical simulation of the axisymmetric hollowing instability. Memorandum report, 8:54569 (R;US)
See Lampe, M., 8:55234
Justiniano, E., *See* Schuch, R., 8:55105

K

Kacenjar, S.T., *See* Ripin, B.H., 8:55254
Kaerker, S., Dismantling of the R1 reactor, Stockholm, 8:53996 (RA;US)
Kahn, S., *See* Engelmann, R., 8:54576
Kahn, S.A., *See* Gordon, H.A., 8:54728
Kaiser, G.E., Instrumentation of an HTR and its environmental conditions, 8:53884 (R;XA)

Task and the technique of temperature instrumentation of HTR's, 8:53878 (R;XA)
Kalasky, E.D., *See* Crevier, W.F., 8:54754
Kam, A.L., Energy-conservation programs, State Department of Transportation, 8:54150 (RA;US)
Kameoka, T., Analysis of pressure drop accidents in high temperature gas-cooled reactors, 8:54038 (RA;JP;In Japanese)
Kamieniecki, E., *See* Bagilo, J.A., 8:53784
Kamimura, T., *See* Endo, T., 8:53875
Kamins, R.M., Resource rights: geothermal and solar energy, 8:54109 (RA;US)
Kaminskij, N.I., *See* Aksinenko, V.D., 8:54699
Kamitakahara, W.A., Phonon dispersion of transverse basal-plane modes in alkali-graphite compounds, 8:54253 (R;US)
See Shanks, H.R., 8:54277
Kamlet, M.J., Some comments regarding the sensitivities, thermal stabilities, and explosive performance characteristics of fluorodinitromethyl compounds, 8:54794 (RA;US)
See Short, J.M., 8:54857
Kammerud, R., *See* Bauman, F., 8:54139
Kampas, F.J., *See* Delahoy, A.E., 8:54290
Kanaji, T., Characteristics of three-grid type modulated Bayard-Alpert ionization gauge in ultra high vacuum region, 8:54548 (RA;JP;In Japanese)
Kanamori, M., *See* Doke, T., 8:54733
See Murakami, H., 8:54734
Kanarek, T., *See* Grishin, V.G., 8:55173
Kanashov, B.A., *See* Basova, B.G., 8:53967
Kanavets, V.P., Threshold Cherenkov counter, 8:54692 (R;SU;In Russian)
Kanda, K., *See* Murata, N., 8:53919
See Shiroya, S., 8:53964
Kane, V.E., *See* McLean, R.B., 8:53862
Kang, S.J., Inhibition of nitrification by chromium in a biodisc system, 8:55068 (R;US)
Kania, M.J., *See* Homan, F.J., 8:53892
Kanunnikov, Yu.S., *See* Bondarenko, V.V., 8:53928
Kapaloski, L., *See* Bagley, J.M., 8:54959
Kapetanakos, C.A., *See* Sprangle, P., 8:54571
Karakhanov, S.M., *See* Titov, V.M., 8:54816
Karas, J., *See* Pugmire, R.J., 8:53375
Kartoprawiro, I.M., Rice protein improvement through mutation breeding techniques, advance evaluations. Part of a coordinated programme on use of nuclear techniques for cereal grain protein improvement. Final report for the period 1 March 1980 - 31 December 1982, 8:55042 (R;XA)
Karyshev, Yu.Ya., *See* Grashilin, V.A., 8:54762
Kasper, G., Dry storage instrumented bundle experiments, 8:53589 (BA;XN)
Kaspin, A.I., Software for the AIST measurement and calculational complex. Service routines for editing and statistical processing files on a magnetic tape, 8:53939 (R;SU;In Russian)
Kassel, C., *See* Broese, J.M., 8:54858
Kasten, F., Studies on parameterization of global, diffuse and direct solar radiation. Final report, 8:53757 (R;US)
Kasuya, K., *See* Mutou, M., 8:54609
Katayama, T., Outline of heavy ion beam accelerator for inertial confinement fusion, 8:54639 (RA;JP)
Kato, H., *See* Hongo, T., 8:54473
Kato, Y., Brightness temperature of detonation wave in nitromethane-tetranitromethane mixtures and in gaseous mixtures at a high initial pressure, 8:54845 (RA;US)
See Presles, H.N., 8:54829
Kawabe, T., Closed orbit correction in accumulation ring of TRISTAN, 8:54589 (R;JP)
Kawakami, H., *See* Fujita, Y., 8:54685, 8:54687, 8:54688
Kawasaki, M., *See* Aoki, S., 8:53507
Kayser, D.C., *See* Giguere, R.P., 8:54784
Kayser, G., *See* Le Rigoleur, C., 8:53987
Kazmerski, L.L., Advances in photovoltaics R and D: an overview, 8:53782 (R;US)
Kearns, H.S. Jr., Energy-conservation programs: County of Hawaii, 8:54178 (RA;US)
Keefe, R.L., Delayed detonation in card gap tests, 8:54807 (RA;US)
See Butcher, A.G., 8:54799
Keen, R.E., *See* Barrio, J.R., 8:54348
Keese, H., TN 1300 transport/storage cask system, 8:53496 (RA;US)
Kehres, L.A., *See* Fajer, J., 8:54339
Keinonen, R.S., *See* Lund, P.D., 8:53810
Keiser, J.R., *See* Gray, R.J., 8:53364
Keith, K.M., State energy planning, 8:54084 (RA;US)
Keller, L.P., SLAC users bulletin No. 95, March-July 1983, 8:54605 (R;US)
Kelley, J.H., Hydrogen in energy, 8:53733 (RA;US)
Kello, D., *See* Erdreich, L.S., 8:55071
Kelly, J.J., Spent fuel: transportable, 8:53522 (RA;US)
Kempka, S.N., *See* Sutherland, S.H., 8:53540
Kendal, M., *See* Burnett, P., 8:53879
Kenik, E.A., Dynamic recording system for HVEM in situ studies, 8:54767 (RA;US)
In situ deformation and fracture studies on precipitation-hardened aluminum alloys, 8:54233 (RA;US)
See Hackney, S.A., 8:54223
Kennedy, W.E. Jr., Potential low-level waste disposal limits for activation products from fusion, 8:53677 (R;US)
Kent, J.C., *See* Campbell, D.K., 8:53839
Kephart, R., Detector with a 3 T solenoid for a 10 TeV collider, 8:54725 (RA;US)
Kepple, P., *See* Cauble, R., 8:55235
Kern, E.C. Jr., Development and evaluation of solar-photovoltaic systems. Final report, 8:53790 (R;US)
Ketelle, R.H., *See* Lee, D.W., 8:53674
Kew, P.A., Design, construction and testing of a gas engine driven high temperature industrial heat pump. Final report, 8:54170 (R;US)
Key, C.R., *See* Samet, J.M., 8:55033
Keyser, R.E., CO_2-recovery from flue gases, 8:54886 (R;US)
Kharin, A.M., *See* Golovin, V.M., 8:54585
Khasainov, B.A., Two-phase visco-plastic model of shock initiation of detonation in high density pressed explosives, 8:54820 (RA;US)
Khizhnyak, N.A., *See* Bomko, V.A., 8:54565
Khoe, T.K., Note on depolarizing resonances in the KEK 12 GeV synchrotron, 8:54590 (R;JP)
Kholan, P., *See* Grishin, V.G., 8:55174
Khomenko, B.A., *See* Bystritskij, V.M., 8:54696
Khosla, P.K., *See* Ramakrishna, K., 8:54520
Khovanskij, N.N., *See* Bystritskij, V.M., 8:54696
See Krumshtejn, Z.V., 8:54697
Khrykin, A.S., *See* Alfimenkov, V.P., 8:55180
Kiel, W.A., Regiospecific and stereospecific reactions of $Ph_3C^+ PF_6^-$ with rhenium alkyls (eta-C_5H_5)Re(NO)(PPh$_3$)(R). α- vs β-hydride abstraction, 8:54323 (J;US)
Kiggans, J.O., *See* Liou, R.S., 8:55051
Kikuchi, J., *See* Doke, T., 8:54733
Kikuchi, S., Overview of DOE/PNC joint program on transportation technology, 8:53509 (RA;US)
Kilimeyer, R.P. Jr., Coal preparation, 8:53419 (BA;US)
Kim, K., *See* Sandusky, H.W., 8:54851
Kim, M.G., *See* Beruto, D., 8:54308
Kim, S.B., *See* Snipes, J.A., 8:55244
Kim, S.H., a-c losses of 19-strand subcables for the ANL 3.3-MJ coil, 8:54471 (R;US)
King, A., Calibration and use of a lung-monitoring facility using sodium iodide detectors, 8:55215 (R;US)
King, C.J., Process for removal of ammonia and acid gases from contaminated waters, 8:54948 (P;US)
See Mohr, D.H. Jr., 8:53371
King, J.F., *See* Klueh, R.L., 8:54245
King, N.S.P., *See* Baer, H.W., 8:55177
King, P.H., Physical-chemical treatment of tar-sand processing wastewater, 8:53462 (R;US)
Kinley, H.J., Radioactive materials transportation: state regulation and enforcement, 8:53549 (RA;US)
Kinoshita, C., Study of radiation damage in MgO using HVEM, 8:54259 (RA;US)
See Nakai, K., 8:54229
Kinoshita, K., Influence of heat-treatment and physicochemical properties on the electrochemical oxidation of carbon blacks in phosphoric acid, 8:54049 (R;US)
Kirchner, B., TN 17/3: a cask designed for the transport of irradiated fuel to a PIE facility, 8:54387 (RA;US)
Kirillov, A.A., *See* Gavrilin, V.A., 8:53936
Kiritani, M., *See* Hirata, M., 8:54230
Kirk, H., *See* Engelmann, R., 8:54576
See Herrera, J., 8:54632
Kirolous, H.A., *See* El Nadi, A.M., 8:55240
Kirschfink, F.J., *See* Althoff, M., 8:55136
Kirts, R.E., Control strategies for reducing heating, ventilating, and air conditioning (HVAC) energy consumption in single buildings. Final report Jan-Jun 82, 8:54127 (R;US)
Kishida, K., Theoretical and experimental notes on noise phenomena of KUR, 8:53966 (RA;JP;In Japanese)
Kitajima, S., *See* Kinoshita, C., 8:54259
See Nakai, K., 8:54229

Kitchin, H.D., *See* Oicles, J.A., 8:55309
Kittinger, W.D., Lessons learned in decommissioning the Sodium Reactor Experiment, 8:53990 (RA;US)
Kiuttu, G.F., *See* Adler, R.J., 8:54570
Klages, M.G., Clay minerals in Northern Plains coal overburden as measured by X-ray diffraction, 8:54916 (J;US)
Klee, C., Sensitivity to initiation of HE-wax compounds at different temperatures, 8:54813 (RA;US)
Klefer, J.H., *See* Al-Alami, M.Z., 8:54366
Klein, G., Photoelectron-photon coincidences in anthracene crystals, 8:54674 (R;FR)
Klimenko, V.Yu., *See* Dremin, A.N., 8:54846
Kline, W.H., Decommissioning a plutonium fabrication facility, 8:53612 (RA;US)
Klingler, L.M., Cyclone incinerator: operating experience, 8:53651 (R;US)
Klontz, G.W., *See* Downey, P.C., 8:53779
Klueh, R.L., Austenitic stainless steel-ferritic steel weld joint failures, 8:54245 (J;US)
Kluk, A.F., *See* Oertel, G.K., 8:53610
Klusek, C.S., Trace element and radionuclide mass balances at a coal-fired electric generating station, 8:54888 (J;GB)
Kniazewycz, B.G., Data requirements for meaningful long-term epidemiology study of the commercial nuclear power industry, 8:55021 (RA;US)
Knights, D.E., Benefits to industry of improved efficiency motors. Final report, 8:54165 (R;US)
Knob, P., *See* Neef, R.D., 8:53883
Knox, N.P., *See* Fore, C.S., 8:53502
Knudsen, H.K., Linked-state machines, 8:55338 (R;US)
Knystautas, R., *See* Lee, J.H.S., 8:54036
Kobayashi, K., Transmission experiment by the simulated LMFBR model and propagation analysis of acoustic signals, 8:53947 (R;JP)
Kobayashi, M., Present status of the vacuum system of the electron storage ring, 8:54640 (RA;JP;In Japanese)
Kobayashi, S., *See* Tasuda, M., 8:54438
Kober, E.M., Concerning the electronic structure of the ions $M(bpy)_3^{3+}$ (M = Fe, Ru, Os; bpy = 2,2'-bipyridine), 8:54330 (J;US)
Koch, C.A., *See* Marchant, L.C., 8:53455
Koch, D.A., Preparing a decommissioning cost and technology study, 8:54006 (RA;US)
Kochanski, T.P., *See* Snipes, J.A., 8:55244
Kocher, C.A., Thermal-energy scattering of atoms in high Rydberg states. Final report, 8:55113 (R;US)
Kodaira, K., Material surveillance program of JOYO, 8:53970 (R;JP)
See Nakano, M., 8:53969
Kodres, C.A., Parametric examination of the heat recovery incinerators at NAS (Naval Air Station), Jacksonville. Report for Oct 81-Sep 82, 8:54157 (R;US)
Koegel, G., Doppler-broadening lineshape parameter standard, 8:54751 (BA;NL)
Koehler, D.R., Double resonator cantilever accelerometer, 8:54779 (P;US)
Koehler, P.W., Energy-conservation program: University of Hawaii at Manoa, 8:54077 (RA;US)
Koetzle, T.F., *See* Iizumi, M., 8:54263
Kohler, S.M., *See* Andreas, R.D., 8:53436
Kohloss, F.H., Proper engineering for energy conservation, 8:54132 (RA;US)
Kohno, Y., *See* Igata, N., 8:54232
See Kohyama, A., 8:54231
Kohyama, A., Cavity growth in dual-ion and/or electron irradiated type 316 stainless steel, 8:54231 (RA;US)
Koizumi, C.J., Model for water factor measurements with fission-neutron logging tools. National Uranium Resource Evaluation, 8:54781 (R;US)
Kok, K.D., *See* Burian, R.J., 8:53705
Kolb, C.R., Palynological studies Vacherie and Rayburn's domes North Louisiana salt dome basin, 8:53665 (RA;US)
Kolber, A.B., *See* Harley, N.H., 8:55012
Kolesov, A.G., *See* Belanova, T.S., 8:55196
Kolosov, V.N., *See* Akimenko, S.A., 8:54682
Komaba, T., *See* Araki, H., 8:53946
Komochkov, M.M., *See* Alejnikov, V.E., 8:54700
Komoriya, H., Reduced-enrichment fuel alternatives for the JAERI reactors, 8:53960 (R;US)
Kondratowicz, L.J., Oil spill incidence simulation model: description and user's manual, 8:53442 (R;US)
Konecny, R., *See* Kramer, S.L., 8:54574
Koneru, P.B., *See* Bostwick, L.E., 8:53335
Konishi, E., *See* Akashi, M., 8:55147
Konnick, P.J., Hermetically sealed microminiature multisocket connector, 8:54552 (R;US)
Konno, O., Project of aluminium ducts for pulsed beam stretcher, 8:54614 (RA;JP;In Japanese)
Kononenko, G.A., *See* Churakov, A.K., 8:55336
Konoplyannikov, A.K., *See* Bushnin, Yu.B., 8:54679
Konzek, G.J., Decommissioning reference nuclear research and test reactors, 8:54009 (RA;US)
Kooker, D.E., Mechanism for the burning rate of high density, porous, energetic materials, 8:54803 (RA;US)
Kopp, O.C., Additional observations on the ferric ion (Fe^{3+}) content of melt-grown fayalite (Fe_2SiO_4), 8:54287 (J;US)
Korbel, Z., *See* Grishin, V.G., 8:55174
Kornhauser, M., Improved approximate model of explosive casing expansion, 8:54850 (RA;US)
Korotkov, A.I., *See* Khasainov, B.A., 8:54820
Kosky, P.G., *See* Maylotte, D.H., 8:53367
Kosorukova, L.A., *See* Basova, B.G., 3:53967
Kosourov, K.B., *See* Krajnov, Yu.A., 8:53937
Kotler, L.H., Improved measurement system for the whole body monitor, 8:54664 (RA;AU)
Studies of the calcium metabolism of subjects with renal dysfunction, 8:54965 (RA;AU)
Kotov, V.I., *See* Bryukhanov, N.S., 8:54684
Koudinov, A.V., Quantum-mechanical oscillator with an arbitrary anharmonicity 1/N expansion and perturbation theory, 8:55224 (R;SU)
Kousari, B., *See* Daemen, J.J.K., 8:53657
Kovacic, S.M., Improved prediction of flame spreading during convective burning in solid propellant cracks, 8:54361 (RA;US)
Kowalewsky, H., Criteria for and proof of leaktightness concerning casks for dry transport and intermediate storage of spent LWR-fuel elements, 8:54408 (RA;US)
Kozlovski, Z., *See* Ter-Akopyan, G.M., 8:54761
Kragl, W., *See* Amrhein, W., 8:54129
Krajnov, Yu.A., BIPRUS code, 8:53937 (R;SU;In Russian)
Kralik, M., *See* Bechvarzh, F., 8:55186
Krall, N.A., *See* Hamasaki, S., 8:55317
Kramer, P., *See* Honodel, C.A., 8:54819
Kramer, R., *See* Cristy, M., 8:55216
Kramer, S.L., Relativistic-beam Pickup Test Facility, 8:54574 (R;US)
Kraner, H.W., *See* Isaacs, H.S., 8:54208
Krause, L.J., Electroless metal plating of plastics, 8:54244 (P;US)
Kreid, D.K., *See* Hauser, S.G., 8:54523
Kreischer, K.E., *See* Temkin, R.J., 8:54555
Kreubig, M., Studies on fluid impurities due to accidents in the containment of PWR reactors, 8:54023 (R;DE;In German)
Kreuzmann, A.B., Method for the recovery of uranium values from uranium tetrafluoride, 8:53472 (P;US)
Krieger, F., *See* Viecenz, H.J., 8:53636, 8:53640, 8:54018
Kriks, H.J., Report on the operation of the FMRB reactor and related activities in the year 1981, 8:53982 (R;DE;In German)
Kroeger, P.G., Thermohydraulics in a high-temperature gas-cooled reactor primary loop during early phases of unrestricted core-heatup accidents, 8:53985 (R;US)
Kronfeld, J., Th-230/Th-232 sedimentation rates and the natural radiation background along the western coast of Israel. Final report for the period 15 December 1977 - 31 October 1981, 8:54953 (R;XA)
Krsul, J.R., *See* Porter, D.L., 8:55283
Krueger, K., AVR-pebble-bed reactor: Core-physics control without incore-instrumentation, 8:53887 (R;XA)
Krueger, R.J., *See* Corones, J.P., 8:55223
Kruger, P., *See* Ramey, H.J. Jr., 8:53837
Krumlinde, J., Calculation of nuclear properties far from the line of β stability, 8:55189 (R;US)
Krumshteja, Z.V., Organization of the RISK spectrometer electronic logic circuits on the base of the event preliminary selection unit, 8:54697 (R;SU;In Russian)
See Akimenko, S.A., 8:54682
Krupka, K.M., Validation of the WATEQ4 geochemical model for uranium, 8:53675 (R;US)
Krusche, M., *See* Doerschel, B., 8:54742, 8:54744
Kubechek, V., *See* Bechvarzh, F., 8:55186
Kubo, M., *See* Kikuchi, S., 8:53509
See Leisher, W.B., 8:54410
See Oshima, H., 8:54397
Kubono, S., *See* Hansen, O., 8:55181

Kuehnel, R.R., *See* Bokelmann, R.F., 8:53599
Kuhns, S.J., Carrier's real world when transporting radioactive materials for the United States government, 8:53521 (RA;US)
Kuijvenhoven, L.J., *See* Keyser, R.E., 8:54886
Kukacka, L.E., *See* Sugama, T., 8:54284
Kulabukhov, Yu.S., *See* Bondarenko, V.V., 8:53928
Kulinski, S., Program LINEL of calculation of resonant structures for linear accelerators, 8:54580 (R;PL;In Russian)
Kuljukina, L.A., *See* Dvurecenskij, A., 8:54701
Kumada, M., *See* Irie, Y., 8:54588
Kumar, M., *See* Kovacic, S.M., 8:54361
Kumar, M.B., Saline spring study, 8:53668 (RA;US)
Surface hydrology study, 8:53669 (RA;US)
Kung, H.H., Solid-state, surface, and catalytic properties of oxides. Progress report, October 1, 1982-August 31, 1983, 8:54306 (R;US)
Kunnmann, W., *See* Zhuang, J., 8:54241
Kuo, K.K., *See* Kovacic, S.M., 8:54361
Kupperman, R.H., *See* Salzman, G.C., 8:54918
Kuroda, Y., Detection of interactions between wave components at different frequencies of a random signal, 8:53921 (RA;JP;In Japanese)
Kurth, W.S., *See* Reinleitner, L.A., 8:55091
Kurtz, E.F., *See* Thompson, M.L., 8:53617
Kut'in, V.M., *See* Akimenko, S.A., 8:54682
Kuz'minov, V.V., Combined method of elements in solving the gas kinetic equation of neutron transport, 8:53898 (R;SU;In Russian)
Kuznetsov, V.S., Determination of radiation heating in a critical assembly, 8:53916 (R;SU;In Russian)
Kveseth, N.J., *See* Abdullah, M.I., 8:54947
Kvitek, I., *See* Gledenov, Yu.M., 8:55178
Kwok, M.A., *See* Durran, D.A., 8:54494
Kypreos, S., 'Modal Splits' for safeguarding Switzerland's energy supply until the year 2000, 8:54056 (R;CH;In German)

L

LaBar, M.P., Experience in BWR control rod shipping, 8:53893 (RA;US)
Lacey, J.J., Direct hydrogenation and solvent extraction of coal, 8:53334 (R;US)
Ladouin, V., Plant physiological isotope aided studies specific to rubber trees, 8:54992 (RA;XA)
Lafontaine, L., *See* Draulans, J., 8:53569
See Price, M.S.T., 8:54429
Lagerquist, C.R., Improvement in radiation exposure measurements at Rocky Flats over the past 30 years and its possible impact on epidemiological studies, 8:54922 (RA;US)
Lahey, T.J., *See* Kline, W.H., 8:53612
Laine, E.F., Acoustic-velocity measurements in materials using a regenerative method, 8:54775 (P;US)
Lakdawala, V.K., *See* Carter, J.G., 8:54550
Lake, W.H., Containment system evaluation, 8:54407 (RA;US)
Thermal analysis of packaging using the integral method, 8:53542 (RA;US)
See Gordon, L.L., 8:54453
Laletine, N.I., Derivation of the finite difference equations for a heterogeneous reactor. 2. Square, triangular and double reactor lattices, 8:53915 (R;SU;In Russian)
Lamanna, W., *See* Schultz, A.J., 8:54318
Lamb, J.A. Sr., Cargo security: a review of physical security techniques for shipping radioactive materials, 8:53714 (RA;US)
Lambert, D.R., Rolling-cuff flexible bellows, 8:54482 (P;US)
Lambourn, B.D., *See* Hoskin, N.E., 8:54848
Lambrecht, R.M., Differential radioactivity monitor for non-invasive detection of ocular melanoma, 8:54977 (P;US)
See Rescigno, A., 8:54291
Lamby, E.J., *See* Maylotte, D.H., 8:53367
Lampe, M., Stabilizing effect of gas conductivity evolution on the resistive sausage mode of a propagating beam. Memorandum report, 8:55234 (R;US)
See Joyce, G., 8:54569
Lampe, R.L., *See* Bennett, B.I., 8:54904
Lancaster, H.D., Stabilized radio-frequency quadrupole, 8:54628 (P;US)
Land, C.E., Some statistical considerations related to the estimation of cancer risk following exposure to ionizing radiation, 8:55007 (RA;US)
Lande, K., *See* Cherry, M.L., 8:54647, 8:54653
Lander, G.H., Pulsed neutrons: One year of experience with the new source at Argonne National Laboratory, 8:55117 (J;NL)
Landers, N.F., *See* Parks, C.V., 8:54461
Landman, U., Structure and reactivity of heterogeneous surfaces and study of the geometry of surface complexes. Progress report, January 1, 1983-December 31, 1983, 8:54307 (R;US)
Landolt, R.R., Evaluation of a small, inexpensive incinerator for institutional radioactive waste, 8:53685 (J;GB)
Landrigan, P.J., *See* Rinsky, R.A., 8:55010
Landrum, V., *See* Hoots, S.S., 8:54749
Lang, D.D., *See* Calderon, M.O., 8:55311
Lang, K., Industrial electricity conservation potential in the Pacific Northwest. Final report. Volume II. Appendices, 8:54181 (R;US)
Industrial-electricity-conservation potential in the Pacific Northwest. Volume I. Final report, 8:54180 (R;US)
Langacker, P., Theoretical perspective for baryon number violation, 8:55144 (RA;US)
Langland, R.T., *See* Schwartz, M.W., 8:54378
See Woo, H.H., 8:54448
Langroo, M.K., Solid state track detection using CR-39, 8:54666 (RA;AU)
Larson, D.T., *See* Bagley, J.M., 8:54959
Larson, D.W., Caldecott tunnel fire thermal environments, regulatory considerations and probabilities, 8:53576 (RA;US)
Larson, G.F., Contribution to ASTM C-26.05 Task Group: determination of impurities in uranium by ICP-AES after separation with TBP, 8:54303 (R;US)
Larson, M., *See* Levenspiel, O., 8:53776
Later, D.W., *See* Wilson, B.W., 8:53428
Lathrop, J.W., Investigation of accelerated stress factors and failure/degradation mechanisms in terrestrial solar cells. Fourth annual report, 8:53775 (R;US)
Lau, K.H., *See* Wood, B.J., 8:53356
Lau, L., *See* Sweeney, J.L., 8:54054
Laub, B., One dimensional foam thermal modeling of TRUPACT wall section, 8:54403 (RA;US)
Lauber, T.S., Efficient technique for calculating multiple solutions of electric-field problems. Part I. Final report, 8:55221 (R;US)
See Theodossiou, G.G., 8:55222
Lauder, R.A., *See* Duggleby, J.C., 8:54896
Lauer, H., Super Phenix spent fuel storage cask, Castor SPX, 8:53494 (RA;US)
Lauf, R.J., *See* Morgan, C.S., 8:54261
Laug, M.T., *See* Porter, D.L., 8:55283
Laurer, G.R., *See* Cohen, N., 8:55050
Lawler, R.G., *See* Trifunac, A.D., 8:54305
Lawless, K.R., *See* Hackney, S.A., 8:54223
Lawrance-Owen, P.N., *See* Potter, I.N., 8:53807
Lawrence, K.E., *See* Rice, G.W., 8:54293
Lawson, R.E. Jr., Determination of good-engineering-practice stack height: a fluid mode demonstration study for a power plant, 8:53860 (R;US)
Lawton, H., Decommissioning of the Windscale Advanced Gas-Cooled Reactor, 8:54005 (RA;US)
Lawver, B.S., *See* Rosen, L.C., 8:54037
Lax, M., *See* Coffey, B.J., 8:54512
Lazarevitch, S., Three years of experience and future prospects in maintenance and reinspection on LWR-irradiated fuel transport flasks, 8:54454 (RA;US)
Lazarus, M.S., X-ray photoelectron spectroscopy (XPS) studies of hydrogen reduced rutile (TiO/sub 2-x/) surfaces, 8:54260 (J;NL)
Le Rigoleur, C., Internal core catcher in Super Phenix, 8:53987 (R;FR)
Leach, V.A., Atmospheric dispersion of radon gas from a shallow, extended uranium ore body, 8:53467 (RA;AU)
See Fry, J., 8:54659
Leber, R.L., *See* Hoard, R.W., 8:55310
Leboeuf, C.M., *See* May, E.K., 8:53792
Lebrun, P., *See* Cox, B., 8:54716, 8:54719
Lederman, L.M., State of the art, 8:54726 (RA;US)
Lee, C.K., *See* Cherry, M.L., 8:54647, 8:54653
Lee, D.D., Physical properties of SRC-I slurries under preheater conditions. Final report, 8:53348 (R;US)
Lee, D.M., Method and apparatus for measuring reactivity of fissile material, 8:53722 (P;US)
Lee, D.W., Use of DOE site selection criteria for screening low-level waste disposal sites on the Oak Ridge Reservation, 8:53674 (R;US)

Lee, J.D., *See* Hoard, R.W., 8:55310
Lee, J.H.S., Detonation of hydrogen-air mixtures, 8:54036 (R;US)
Lee, J.J., *See* Schulz, R.J., 8:54113
Lee, L., *See* Moore, K.J., 8:54340
Lee, L.M., *See* Stanton, P.L., 8:54852
Lee, M.H., Study of mechanism of hydrogen diffusion in separation devices. Progress report for 1980-1983, 8:53730 (R;US)
Lee, P.C., *See* Matheson, M.S., 8:53735
Lee, P.R., *See* Dyer, A.S., 8:54864
Lee, R.S., *See* Honodel, C.A., 8:54819
Lee, S.Y., Dissolution characteristics of Pu-contaminated soils and sediments in lung serum simulant solution, 8:55063 (J;GB)
Lee, T.S., *See* Miller, J.F., 8:54047
Lee, T.S.H., Meson-exchange Hamiltonian for NN scattering and isobar-nucleus dynamics, 8:55145 (R;US)
Lee, Y.F., *See* Clements, L.D., 8:54521
Lee, Y.M., *See* Wilson, D.R., 8:54116
Leenanupan, V., Development of preconcentration techniques for the determination of cadmium, copper, lead and zinc in sea water in conjunction with flame atomic absorption spectrophotometry, 8:54298 (R;TH)
Leeper, R.J., *See* Burns, E.J.T., 8:55300
See Dreike, P.L., 8:55299
Legendre, A.L., Modular solar panel, 8:53823 (P;FR;In French)
Legrand, N., *See* Donguy, P., 8:54837
Legrele, C., One nanosecond resolution time-to-digital converter, 8:54669 (R;FR)
Leidinger, B.J.G., *See* Bokelmann, R.F., 8:53599
Leimert, R.A., *See* Daugherty, J.M., 8:54195
Leisher, W.B., Helium/solid powder O-ring leakage correlation experiments, 8:54410 (RA;US)
In-situ permeation tests of elastomeric O-ring seals, 8:54413 (RA;US)
Metallic seal testing, 8:54414 (RA;US)
See Diggs, J.M., 8:54391
Leitch, M., *See* Baer, H.W., 8:55177
Leith, D.W.G.S., *See* Goldberg, M., 8:54721
Leith, I.S., Use of solid state detectors for spectrometry of conversion electrons emitted in the decay of lead-210, 8:54667 (RA;AU)
See Cooper, M.B., 8:53365
Leithner, D.E., Instrumentation of steam cycle HTR's up to 900 MWe, 8:53885 (R;XA)
Leitnaker, J.M., *See* Bradley, D.J., 8:54247
Lempges, C., *See* Burgy, D., 8:53944, 8:53945
Lenail, B., Facility-transportation system interface at COGEMA: experience in the taking delivery of spent fuel, 8:53503 (RA;US)
Transport of irradiated fuel to the La Hague reprocessing plant, 8:53565 (RA;US)
See Gustafsson, B., 8:53559
See Lazarevitch, S., 8:54454
Lenkevich, M.J., *See* Stanbro, W.D., 8:53388
Lepel, E.A., *See* Abel, K.H., 8:54000
Lepoultel, D., Heating system for a solar receiver, 8:53793 (P;FR;In French)
Leskovar, B., Low-noise gallium-arsenide field-effect transistor preamplifiers for stochastic beam-cooling systems, 8:54619 (R;US)
Leslie, S.G., *See* Liu, C.S., 8:54497
Lesmond, C., Superconducting magnet activities at CEN Saclay. A brief summary, 8:54474 (R;JP)
Lesny, D., FASTBUS Diagnostic Language users manual. Version 3(74), 8:55335 (R;US)
Lesny, D.D., *See* Abraham, S., 8:55334
Lessard, D., Tower-based OTEC design for Hawaii, 8:53795 (RA;US)
Lestz, S.J., *See* Montemayor, A.F., 8:54194
Letourneau, E.G., Lung cancer mortality and indoor radon concentrations in 18 Canadian cities, 8:55035 (RA;US)
Lettnin, H.K.J., Decommissioning of NS OTTO HAHN, 8:53992 (RA;US)
See Viecenz, H.J., 8:54018
Letwin, H.M., *See* Hargrave, N.J., 8:55208
Leung, S.L., *See* Schoenleber, R.W., 8:54328
Levatter, J.I., *See* Young, R.T., 8:54283
Levenson, J.B., CEREAS: an interactive computer-mapping system for environmental assessments, 8:53439 (R;US)
Levenspiel, O., Preliminary study of a radiantly heated fluidized bed for the production of high-purity silicon, 8:53776 (R;US)
Levine, J., ECRH transmission system, 8:55277 (RA;US)
Levine, M.J., *See* Hansen, O., 8:55181
See Thorn, C.E., 8:54631
Levy, L.H., Utility perspective of nuclear facility decommissioning, 8:53989 (RA;US)
Levy, M., *See* Falco, J.J., 8:54126
Lewandowski, E., *See* Groh, E.F., 8:53934
Lewis, A.R., *See* Bohac, C.E., 8:53756
Lewis, B., *See* Trujillo, A.A., 8:54451
Lewis, B.A., *See* May, R.A., 8:54444
Lewis, J. Jr., *See* Wrenn, G.E. Jr., 8:54369
Lewis, W.T., *See* Beach, R.L., 8:53438
Leyton, L., Applications of neutron moisture depth probes in tree research, 8:54989 (RA;XA)
Use of isotopes in the study of plant water relations, 8:54994 (RA;XA)
Water relations of mycorrhiza, 8:54995 (RA;XA)
Li, A., Energy recovery from pretreatment of industrial wastes in the anaerobic fluidized bed process, 8:54158 (R;US)
Liberman, I., *See* Liu, C.S., 8:54497
Liboff, R.L., Exciton-laser amplifier. Interim technical report, 8:54508 (R;US)
Study of a nuclear gamma-ray laser. Interim technical report, 8:54506 (R;US)
Lichtenberg, A.J., *See* Najmabadi, F., 8:55318
Liddiard, T.P., Initiation of burning and detonation in cast H-6 and cast PBXW-109, 8:54811 (RA;US)
See Coffey, C.S., 8:54859
Lieberman, M.A., *See* Najmabadi, F., 8:55318
Liepins, R., Method of forming graded polymeric coatings or films, 8:53724 (P;US)
Lillie, A.F., *See* Torrisi, S.P., 8:53614
Lin, C.D., Atomic-orbital expansion model for describing ion-atom collisions at intermediate and low energies, 8:55107 (R;US)
Lin, G.Y., *See* Kiel, W.A., 8:54323
Lin, H.B., *See* Fried, A., 8:54878
Lin, M.C., Moessbauer spectroscopy study of amorphous $Fe_{67}B_{11}Au_5$ ribbon and its crystallization products, 8:54216 (R;US)
Lin, S., Experimental study of resonance radiation trapping as a method of gain improvement for efficient power extraction from the XeF blue-green laser transition. Final technical report 1 Jan 80-30 Sep 81, 8:54504 (R;US)
Lindquist, L.O., *See* Lee, D.M., 8:53722
Link, B.W., Decommissioning of Ames Laboratory Research Reactor, 8:53991 (RA;US)
Linnemann, J.T., Experience with high luminosity running at the CERN ISR, 8:54727 (RA;US)
Liot, *See* Geffroy, 8:53560
Lion, R.S., Molecular cloning and analysis of the endogenous retrovirus chemically induced from RFM/Un mouse cell cultures, 8:55051 (J;US)
Lipkin, J., *See* Bennett, R.H., 8:54769
Lippert, T.E., Testing and verification of granular-bed filters for the removal of particulate and alkalis. Tenth quarterly project report, January 1-March 31, 1983, 8:53385 (R;US)
Lissauer, I.M., Surface drifter study - Beaufort Sea, Alaska. Final report, 8:53437 (R;US)
Little, C.A., *See* Fields, D.E., 8:53684
Liu, C., Generalized network flow model with application to power supply-demand problems, 8:54103 (R;US)
Liu, C.S., Study of short pulse mercury bromide laser. Final report, 15 March-30 November 1982, 8:54497 (R;US)
Liu, K.C., *See* Liboff, R.L., 8:54508
Liu, Y.S., Recent development of high-power visible laser sources employing solid-state slab lasers and nonlinear harmonic conversion techniques. Technical information series, 8:54496 (R;US)
Livesey, E., *See* Burgess, M.H., 8:54416
See Fry, C.J., 8:53543
Lloyd, A.S., Electricity's role in promoting conservation in Hawaii, 8:54092 (RA;US)
Lo, C.C., *See* Leskovar, B., 8:54619
Lobanov, V.F., *See* Titov, V.M., 8:54816
Lockman, W.S., Status of the iota (1440) and θ (1640) as gluonium candidates, 8:55141 (R;US)
Loercher, G., *See* Bergemann, L., 8:54001
Loeschhorn, U., *See* Gallenberger, H., 8:53993
Loftus, J.J., *See* Cuneo, A.A. Jr., 8:54757
Logan, B.G., General ignition requirements in TMR's with drift pumping, 8:55248 (R;US)
Summary of the MARS tandem-mirror reactor design, 8:55313 (R;US)
Lokan, K.H., *See* Leach, V.A., 8:53467
Loken, M.C., Preliminary investigation of the structural influence of entry-entry intersections and inhomogeneous initial-stress fields on repository disposal rooms, 8:53660 (R;US)

Loken, S.C., Collider detectors: present capabilities and future possibilities, 8:54706 (R;US)
Lopez, C.A., *See* Sherman, G. Jr., 8:53872
Lopez, E.H., *See* Bedate, C.A., 8:53781
Lorenz, A., Fifth research coordination meeting on the measurement and evaluation of transactinium isotope nuclear data. Central Bureau for Nuclear Measurements, Geel, Belgium, 1-3 September 1982. Summary report, 8:55195 (R;XA)
IAEA advisory group meeting on nuclear structure and decay data, Zeist, The Netherlands, 11-14 May 1982. Summary report, 8:55162 (R;XA)
Loretto, M.H., *See* White, J., 8:54228
Loring, M., National rf test facility, 8:55270 (RA;US)
Lovill, J.E., *See* Ellis, J.S., 8:54877
Lowe, R.J., *See* Andrews, D.C., 8:54189
Lowenstein, D., *See* Cherry, M.L., 8:54647
Lowry, J.D., Removal of radon from water using granular activated carbon adsorption. Annual report, 8:54300 (R;US)
Lu, B.C.Y., *See* Feng, K.K., 8:54814
Lu, S., *See* Roberts, N.J. Jr., 8:55072
Lucas, H.F., *See* Stebbings, J.H., 8:55026
Lucero, J.P., *See* Bryant, L.E. Jr., 8:54539
Lucht, L.M., *See* Peppas, N.A., 8:53369
Ludford, G.S.S., *See* Buckmaster, J.D., 8:54351, 8:54352, 8:54353, 8:54354, 8:54355, 8:54356, 8:54357, 8:54358, 8:54359, 8:54360
Ludwick, J.D., Decommissioning of independent spent fuel storage installations, 8:53633 (RA;US)
Ludwig, D., *See* Klee, C., 8:54813
Luebelsmeyer, K., *See* Althoff, M., 8:55136
Luehrmann, A., *See* Brinkmann, H.U., 8:53529
See Einfeld, K., 8:53495
See Fleisch, J., 8:53583
Luer, E., *See* Tantau, H.J., 8:54166
Lugol, J.C., *See* Legrele, C., 8:54669
Lum, F.Y.S., How to organize an energy-conservation program for new and existing buildings, 8:54133 (RA;US)
Lumpkin, A., *See* Warren, R.W., 8:54511
Luna, R.E., Generic evaluation of the radiological impacts of transportation within the nuclear fuel cycle, 8:53498 (RA;US)
Lund, P.D., Feasibility of solar pond heating for northern cold climates, 8:53809 (R;US)
Radiation transmission measurements for solar ponds, 8:53810 (R;US)
Lundell, D.J., *See* Schoenleber, R.W., 8:54328
Lundquist, M.L., *See* Amimoto, S.T., 8:54505
Lundy, R.T., *See* Collins, J.J., 8:55059
Lunev, F.A., Invariant current algebra on the light cone and deep inelastic lepton-hadron scattering. 3. Neutrino reactions, 8:55148 (R;SU;In Russian)
Lush, D.M., *See* Campbell, J., 8:53803
Lushbaugh, C.C., DOE health and mortality study at Oak Ridge, 8:55009 (RA;US)
See Cookfair, D.L., 8:55029
See Hudson, D.H., 8:55018
Lustov, N.M., *See* Golovin, V.M., 8:54585
Lyall, H.G., Thermal diode cooling fin concept, 8:54396 (RA;US)
Lyke, S.E., Development of a hot-gas-cleanup system for integrated coal-gasification/molten-carbonate fuel-cell power plants. Quarterly progress report, April-June 1983, 8:54115 (R;US)
Lyman, T.R., Radioactive material transportation (RAMT) shipment study, 8:53577 (RA;US)
Lynch, F., *See* Baker, N., 8:53738
Lynn, K.G., Intense positron beams and possible experiments, 8:55106 (R;US)
Lytle, J.S., Potential damage of oil wastes in coastal estuary sediments, 8:53441 (R;US)
Lytle, T.F., *See* Lytle, J.S., 8:53441
Lyubimov, V.B., *See* Anoshin, A.I., 8:55169

M

Maag, C., *See* Gravitis, I., 8:54871
Maass, K.E., Transport analyses for determination of man-rem dose rates with regard to different modes of transport, routing and packaging, 8:53698 (RA;US)
MacCabe, S., *See* Temkin, R.J., 8:54555
Macdonald, H.F., *See* Goldfinch, E.P., 8:53480
MacDonald, N.S., *See* Barrio, J.R., 8:54348
Macek, V.V., TN cask capabilities for transport of extended burnup fuel assemblies, 8:54431 (RA;US)
MacGregor, B.R., *See* Fry, C.J., 8:53543
MacGregor, R.R., *See* Som, P., 8:54969
Maciel, G.E., *See* Sindorf, D.W., 8:54324
Mack, G.A., *See* Barrett, R.E., 8:53861
Mackenzie, P.D., *See* King, C.J., 8:54948
Macphee, R.C., *See* Armstrong, P.J., 8:54007
Madic, C., Raman spectrometric studies of actinide(V) and -(VI) complexes in aqueous sodium carbonate solution and of solid sodium actinide(V) carbonate compounds, 8:54350 (J;US)
Madsen, M.M., Benchmarking of RADTRAN II, 8:53486 (RA;US)
Truck transportation in the nuclear fuel cycle, 8:53523 (RA;US)
See Luna, R.E., 8:53498
Maeda, Y., *See* Ahrens, L.A., 8:55127
Maekawa, H., *See* Ebisu, T., 8:54412
Maestas, E., Overview of decommissioning policy, standards and practices in NEA member countries, 8:53607 (RA;US)
Maggiore, C.J., *See* Benjamin, T.M., 8:55094
Maier, M., *See* Renfordt, R.E., 8:55194
Maier, P., *See* Beynel, P., 8:54272
Maillie, H.D., Calculating the gastrointestinal tract activity following the inhalation of a radioactive aerosol, 8:55049 (J;GB)
Maixner, R.D., Radiological response training for law enforcement personnel, 8:53709 (RA;US)
Makenas, B.J., *See* Yang, W.J.S., 8:53897
Maki, Y., Experimental and analytical study on shielding of spent fuel shipping cask, 8:54459 (RA;US)
Mal'tsev, I.G., Study on transition processes in the stabilization system with HF feedback coupler, 8:54563 (R;SU;In Russian)
See Mazurov, E.V., 8:54562
Mala, J., *See* de Longueville, Y., 8:54827
See Deneuville, P., 8:54825
Maleyran, R., *See* Bovet, C., 8:54672
Malinauskas, A.P., Accident at Three Mile Island and its aftermath, 8:54021 (R;US)
Mallon, B.J., *See* Harrison, F.L., 8:53393
Manahan, S.E., Laboratory test procedure to determine the mobilization of trace elements and other pollutants during in-situ coal gasification, 8:53351 (R;US)
Mancioppi, S., *See* De Marco, I., 8:53490, 8:53703
See Gualdrini, G.F., 8:54458
Mangusi, J., MTR irradiated fuel transports, 8:53566 (RA;US)
Manheimer, W.M., *See* Colombant, D.G., 8:55258
Maninger, R.C., *See* Blink, J.A., 8:53727
Mann, A.K., Proposal for the establishment of a national underground physics laboratory, 8:54656 (RA;US)
Mann, J.M., Public perceptions of risk, 8:55025 (RA;US)
Mannelli, I., Workshop on SPS fixed-target phsics in the years 1984-1989. Vol. 1. Proceedings, 8:55133 (R;XC)
Manturov, G.N., *See* Savos'kina, G.V., 8:53896
Manucharyan, A.S., *See* Vasinyuk, I.E., 8:54678
Manzke, R., Spectroscopic investigations of the physical state of helium in small bubbles in aluminium and nickel films, 8:54218 (R;DE;In German)
Mao, Y., *See* Letourneau, E.G., 8:55035
Marchal, P., *See* Arnal, T., 8:54395
Marchant, L.C., US tar sand oil recovery projects, 8:53455 (RA;US)
Marchikhin, N.K., *See* Bushnin, Yu.B., 8:54679
Mareev, Yu.D., *See* Alfimenkov, V.P., 8:55180
Marinova, S., *See* Gledenov, Yu.M., 8:55178
Markham, O.D., Iodine-129 in mule deer thyroids in the Rocky Mountain west, 8:54930 (J;GB)
Markin, V.V., *See* Bondarenko, V.V., 8:53928
Marshall, B.W., *See* Grothus, M.A., 8:54768
Marshall, E., *See* Cherry, M.L., 8:54647, 8:54653
Marsi, M., *See* Tam, W., 8:54331
Martem'yanov, A.N., *See* Belova, N.K., 8:54691
Martin, K.E., *See* Price, W.E., 8:54759, 8:54760
Martin, K.R., *See* Wobber, F.J., 8:55079
Martin, L.J., *See* Mika, J.F., 8:54970
Martin, P.J., *See* Barkhordar, P.M., 8:54163, 8:54164
Martin, R.J. III, Effect of strain rate and stress corrosion on the long-term strength of crystalline rocks. Final report, 8:55080 (R;US)
Martin, R.W., Thermal analysis of lead pour fabrication process for a spent fuel shipping cask, 8:54447 (RA;US)

Martin, S.F., Studies of solar flares and erupting filaments. Final report 1 Jul 76-30 Sep 81, 8:55087 (R;US)
Martirosyan, G.M., *See* Vasinyuk, I.E., 8:54678
Martyn, H.U., *See* Althoff, M., 8:55136
Martynov, V.I., *See* Kanavets, V.P., 8:54692
Maslov, M.A., Calculation of muonic fields in the vicinity of high-energy proton accelerators, 8:54606 (R;SU;In Russian)
Mason, G.C., Study of radon emanation from waste rock at Northern Territory uranium mines, 8:53604 (RA;AU)
Mason, J.D., Comments on ISO/TC 97/SC 18/WG3 N120, 8:55331 (R;US)
Mason, M.E., *See* Macek, V.V., 8:54431
Massey, B.L., Regional and local networks of horizontal control, Cerro Prieto Geothermal Area, Mexico, 8:53833 (R;US)
Masslowski, J.P., *See* Huebner, H.W., 8:54390
See Wieser, K.E., 8:54465
Massoth, F.E., Studies on aged H-Coal catalysts. Final report, 8:53350 (R;US)
Matera, R., *See* Boeuf, A., 8:54238
Matheson, M.S., Kinetics of hydrogen production from methyl viologen radicals on colloidal platinum, 8:53735 (J;US)
Mathew, R.M., *See* Checkoway, H., 8:55008
Mathews, F.H., *See* Allen, G.C., 8:54401
Mathiprakasam, B., Evaluation of the use of multicomponent refrigerants in gas-fired heat pumps. Final report Jan 82-Feb 83, 8:54142 (R;US)
Mathis, R.A., *See* Christophorou, L.G., 8:55109
Matis, H.S., *See* Baer, H.W., 8:55177
Matos, J.E., Performance and fuel-cycle cost comparisons with HEU and LEU fuels, 8:53955 (R;US)
See Komoriya, H., 8:53960
See Shiroya, S., 8:53964
Matsubara, Y., *See* Shimade, H., 8:53485
Matsui, M., *See* Iizumi, M., 8:54263
Matsukawa, S., *See* Fukushima, T., 8:54490
Matsuno, Y., *See* Kodaira, K., 8:53970
See Nakano, M., 8:53969
Mattas, R.F., *See* Brooks, J.N., 8:55281
Matthews, J.B., *See* Lissauer, I.M., 8:53437
Matyushin, A.T., *See* Aksinenko, V.D., 8:54699
Matyushin, V.T., *See* Aksinenko, V.D., 8:54699
Mauel, M.E., TARA considerations, 8:55280 (RA;US)
Maurer, W.C., *See* McDonald, W.J., 8:53430
Maurin, C., Experimental study of deflagration to detonation transition case of ammonium perchlorate, 8:54800 (RA;US)
Maus, E.A., Conservation of energy resources, 8:54147 (B;US)
Mautner, M., Ionic hydrogen bond. 2. Intramolecular and partial bonds. Protonation of polyethers, crown ethers, and diketones, 8:54321 (J;US)
Ionic hydrogen bond. 3. Multiple NH^+...O and CH/sup δ/+...O bonds. Complexes of ammonium ions with polyethers and crown ethers, 8:54322 (J;US)
Mauzerall, D., *See* Falkowski, P.G., 8:54967
Maxey, M.N., Radiation risks and benefits: politics and morality, 8:55004 (RA;US)
Maxwell, E.O., Operating experience of vault type dry storage and its relevance to future storage needs, 8:53594 (BA;XN)
May, E.K., Conceptual design of a 20-acre salt-gradient solar pond system for electric power production at Truscott, Texas, 8:53792 (R;US)
May, R.A., Analysis of nuclear material shipping containers using a three-dimensional, dynamic finite element program, 8:54444 (RA;US)
See Nickell, R.E., 8:54388
Maya, L., *See* Hopkins, G.R., 8:55291
Mayberry, M.C., Specific heat of ^{3}He in the Fermi-liquid region, 8:54764 (R;US)
Mayer, H.J., Transport containers for dangerous goods, 8:53745 (BA;DE;In German)
Maylotte, D.H., Computed tomography of coals. Quarterly technical progress report No. 2, November 28, 1982-March 6, 1983, 8:53367 (R;US)
Mayne, C.L., *See* Pugmire, R.J., 8:53375
Mays, C.W., Epidemiological studies of German patients injected with Ra-224, 8:55015 (RA;US)
Mazarakis, M.G., *See* Ramirez, J.J., 8:54566
Mazur, P.O., *See* Cox, B., 8:54716, 8:54719
Mazurov, E.V., Estimations of cavity loading by beam for the linac injector for booster and initial consideration for construction of the power input and RF field stabilization systems, 8:54562 (R;SU;In Russian)
McAllister, J.E. Jr., Vortex-augmented cooling tower - windmill combination, 8:53853 (P;US)
McArthur, W.C., *See* Kniazewycz, B.G., 8:55021
McBeth, R.L., *See* Winans, R.E., 8:53378
McBride, J.A., *See* Johnson, E.R., 8:53598
McClelland, J.B., Experimental determination of the effective nucleon-nucleon interaction for P-nucleus reactions at intermediate energies, 8:55176 (J;NL)
McClelland, J.F., *See* Shanks, H.R., 8:54277
McClure, J.D., *See* Jefferson, R.M., 8:53578
See Lyman, T.R., 8:53577
See Shirley, C.G., 8:53514, 8:53571
See Wingert, V., 8:53706
McConnell, P., Application of linear-elastic fracture mechanics concepts to ferritic spent fuel shipping casks, 8:54379 (RA;US)
Feasibility study for scaling ferritic shipping casks for drop-tests, 8:54428 (RA;US)
McCord, T.B., Hawaii solar pond project, 8:53817 (RA;US)
McCue, D.D., The beginning of ASTM standards for nuclear instrumentation, 8:53949 (J;US)
McCune, R.C., *See* Donlon, W.T., 8:54222
McDaniel, T., *See* Bernatowicz, H., 8:53719
McDonald, W.J., Development of turbodrill tachometer. Final report, 8:53430 (R;US)
McEvilly, T.V., Regional discrimination with broadband data. Final report 1 Oct 81-30 Sep 82, 8:54873 (R;US)
McFadden, K.M., *See* Garland, T.R., 8:54928
McFadden, M.H., *See* Gilbert, K.V., 8:53554
McGhee, D.G., *See* Kim, S.H., 8:54471
McGonnagle, W.J., Evaluation and calibration of a Los Alamos National Laboratory L/sub III/-edge densitometer, 8:54731 (R;US)
McGowan, S., Cadmium telluride detectors for gamma dose-rate meters, 8:54645 (R;US)
McGregor, R.G., *See* Letourneau, E.G., 8:55035
McGuire, E.J., *See* Mehlhorn, T.A., 8:55304
See Montry, G.R., 8:55301
McIntyre, P., Searching for the GUT monopole, 8:54655 (RA;US)
McKenzie, R.L., *See* Richards, L.W., 8:54883
McKown, G.L., *See* Petty, S.E., 8:53763
McLaughlin, S.L., Diesel-engine fumigation with aqueous ethanol, 8:54198 (R;US)
McLean, E.A., *See* Grun, J., 8:55257
See Ripin, B.H., 8:55254
See Rosen, M.D., 8:55315
See Stamper, J.A., 8:55256
McLean, R.B., Impingement of threadfin shad: effects of temperature and hydrography, 8:53862 (J;US)
McLendon, G., *See* Guarr, T., 8:54310
McLeod, K.W., *See* Adriano, D.C., 8:54931
See Corey, J.C., 8:54929
McMahon, R.J., *See* Webster, G.D., 8:54196
McManus, G.J., *See* Burr, J.R., 8:53648
See Fernandez, S.J., 8:53647
McMurray, B.J., *See* Denahm, D.H., 8:53643
McNair, G.W., *See* Cole, B.M., 8:53557
McNeece, J.P., Isotopic composition of irradiated Mark IV and Mark IA fuel, 8:53984 (R;US)
McPherson, M.J., Precision manometer gauge, 8:54777 (P;US)
McSweeney, T.I., *See* Peterson, R.W., 8:53555
Measures, R.M., Application of laser resonance saturation to the development of efficient short wavelength lasers. Annual report for period ending 30 Sep 82, 8:54491 (R;US)
Medinnis, M., *See* Chauvat, P., 8:54713
Mehlhorn, T.A., Beam-target interaction of intense ion beams: theory and experiment, 8:55304 (R;US)
See Olsen, J.N., 8:55302
Meier, W.R., *See* Monsler, M.J., 8:55308
Meinert, N.M., Impact limiter design methodology, 8:54469 (RA;US)
Meisel, D., *See* Matheson, M.S., 8:53735
Melancon, J.L., *See* Iddings, F.A., 8:54732
Melches, C., Development of a dry transport and storage cask for spent

LWR fuel assemblies in Spain, 8:53584 (BA;XN)
Melde, C., *See* Doerschel, B., 8:54744
See Streubel, G., 8:54737
Meleski, S.A., *See* Tobin, R.L., 8:53859
Mellor, J.C., Bathymetry of Alaskan arctic lakes: a key to resource inventory with remote-sensing methods, 8:54933 (R;US)
Melone, S., *See* Boeuf, A., 8:54238
Menard, A.R., Transient heat transfer in coated superconductors. Final scientific report 1 Jun 81-1 Sep 82, 8:55220 (R;US)
Mendel, C.W. Jr., Ampfion hybrid diodes on Hydramite and PBFA-I, 8:55297 (R;US)
Meneghetti, J., *See* Reimers, R.M., 8:54620
Menil, A., *See* Boisard, F., 8:54863
Menossi, C., Evaluation of the radiological risk resulting from road transportation of tritiated water, 8:53491 (RA;US)
See Palacios, E., 8:53693
Meron, M., *See* Schuch, R., 8:55105
Merrill, J.T., Liquid-blocking check valve, 8:54483 (P;US)
Merritt, B.T., *See* Mihalka, A.M., 8:54554
Merten, G.P., *See* Staniunas, J.W., 8:54121
Merz, E., *See* Schneider, K.A., 8:53696
Mestayer, M., *See* Kephart, R., 8:54725
Methling, D., *See* Ospina, C., 8:53493
Metreveli, Z.V., *See* Grishin, V.G., 8:55173
Metz, R.D., *See* Dike, D.H., 8:53461
Metzler, D., ETR transmission systems, 8:55272 (RA;US)
Meuzelaar, H.L.C., Computerized pyrolysis mass spectrometry of coal maceral concentrates, 8:53359 (J;US)
Mewhinney, J.A., Retention of inhaled $^{238}PuO_2$ in Beagles: a mechanistic approach to description, 8:55058 (J;GB)
See Diel, J.H., 8:55054
Meyer, D., Evaluation of clays and clay minerals for application to repository sealing, 8:53672 (R;US)
Meyer, D.E., Chemical selection methods: an annotated bibliography - second edition. Toxics integration information series (final), 8:55344 (R;US)
Meyer, M.A., *See* Som, P., 8:54969
Meyer, R., *See* Romesberg, L.E., 8:54400
Meyer, R.F., Toward an estimate of world heavy crude oil and tar sands resources, 8:53449 (RA;US)
Meyer, T.J., *See* Kober, E.M., 8:54330
Mezzanotte, D.A. Jr., *See* Caskey, G.R. Jr., 8:54210
Mezzina, A., *See* Beller, M., 8:53734
Michael, Samir, Contribution to the minimization of time for the solution of algebraic differential equations system, 8:55230 (R;FR;In French)
Michaelson, S.M., *See* Roberts, N.J. Jr., 8:55072
Michailjuk, K.M., *See* Dremin, A.N., 8:54846
Michaud, C., *See* Brosse, J.M., 8:54858
See Delpuech, A., 8:54792
Michejda, O., *See* Rainisch, R., 8:53871
Michels, H.H., Theoretical studies of kinetic mechanisms of negative ion formation in plasmas. Final technical report 15 Jan 81-15 Jan 83, 8:55104 (R;US)
Michoux, H., *See* Lauer, H., 8:53494
Mickelson, S., 1982 international decommissioning symposium, 8:53988 (R;US)
Mielke, H.G., *See* Alter, U., 8:53469
Mihalka, A.M., FET full-bridge switcher for inductorless capacitor charging for Nova, 8:54554 (R;US)
Mika, J.F., Kilovoltage calibration of medical x-ray generators, 8:54970 (RA;AU)
Mikamo, S., Test of a flash chamber calorimeter as a nucleon decay detector, 8:54657 (RA;US)
Miles, D.E., *See* Daemen, J.J.K., 8:53657
Miles, J.C., *See* Blythe, R.A., 8:54425
Miley, G.H., Study of $O_2(^1\Delta)$ production by nuclear pumping. Final report submitted to the Air Force Weapons Laboratory, 8:54509 (R;US)
Miller, A., *See* Burgy, D., 8:53944, 8:53945
Miller, C., *See* Nolan, D.J., 8:54468
Miller, C.E. Jr., Engineering and planning for the Shippingport Station Decommissioning Project, 8:54004 (RA;US)
Miller, C.G., Utility Applications and Synthetic Fuels and Chemicals Market Sector: workbook, 8:53778 (R;US)
Miller, C.M., Method for quantitative determination and separation of trace amounts of chemical elements in the presence of large quantities of other elements having the same atomic mass, 8:54304 (P;US)
Selective laser ionization for mass-spectral isotopic analysis, 8:55116 (R;US)
Miller, D.R., Analytical model for predicting emergency shutdown of a two-bladed horizontal-axis turbine, 8:53848 (R;US)
Miller, J.F., Application features and considerations in advanced lead-acid and nickel/iron EV batteries, 8:54047 (R;US)
Miller, J.L., Atlas of source emission particles, 8:54876 (R;US)
Miller, K.M., *See* Klusek, C.S., 8:54888
Miller, M., *See* Shirley, C.G., 8:53571
Miller, M.C., *See* Alexander, V., 8:54941
Miller, N.E., *See* Stahl, D., 8:53656
Miller, P.A., Overview of ion-diode research, 8:55298 (R;US)
See Mendel, C.W. Jr., 8:55297
See Sweeney, M.A., 8:55296
Miller, R., *See* Reimers, R.M., 8:54620
Miller, R.L., Evaluation of nuclear facility decommissioning projects program, 8:53634 (RA;US)
Millier, E., *See* Van Doren, C., 8:55045
Milne, T.A., Direct mass-spectrometric studies of the pyrolysis of carbonaceous fuels. I. A flame-pyrolysis molecular-beam sampling technique, 8:53352 (J;NL)
Direct mass-spectrometric studies of the pyrolysis of carbonaceous fuels. II. Qualitative observations of primary and secondary processes in biomass, 8:53783 (J;NL)
Mishima, K., *See* Woodruff, W.L., 8:53961
Missonnier, M., *See* Damamme, G., 8:54833
Mitchell, B.J., Attenuation of seismic waves at regional distances. Final technical report 1 Oct 78-30 Sep 82, 8:54872 (R;US)
Mitchell, T.E., Radiation damage in ceramics: the influence of grain boundaries, 8:54258 (RA;US)
See Donlon, W.T., 8:54222
Mitchell, T.H., *See* Bergstrom, K.A., 8:53680
Mitrosuhardjo, M.M., *See* Leyton, L., 8:54989
Mitryushkin, V.K., *See* Gerdt, V., 8:55158
Mitsel'makher, G.V., *See* Antipov, Yu.M., 8:54698
Mitsuzuku, N., *See* Miyazawa, T., 8:53977
Miura, M., *See* Aoki, S., 8:53507
Mix, L.P., *See* Burns, E.J.T., 8:55300
See Dreike, P.L., 8:55299
Miyaguchi, K., Thermal and hydraulic experiments of JOYO fuel subassembly, 8:53973 (R;JP)
Miyakawa, S., Post irradiation examination of JOYO fuel subassemblies, 8:53972 (R;JP)
Miyazaki, S., *See* Shimade, H., 8:53485
Miyazawa, T., Studies on modeling to failed fuel detection system response in LMFBR, 8:53977 (R;JP)
See Sakai, E., 8:53901
See Sekiguchi, N., 8:53902
Miyazono, F., Energy-conservation programs: County of Maui, 8:54191 (RA;US)
Mizobuchi, A., *See* Chida, K., 8:54642
Mizuta, H., *See* Nomura, Y., 8:54460
Mnatsakanyan, P.S., *See* Avakyan, K.M., 8:54677
Mochizuki, S., *See* Sugita, Y., 8:54466
Moe, H.J., *See* Kline, W.H., 8:53612
See Wynveen, R.A., 8:53627
Moeller, C., Design of the 60 GH/sub z/ system, 8:55273 (RA;US)
Moeller, P., *See* Krumlinde, J., 8:55189
Mohan, V.K., Effect of cavitation on the shock sensitivity of liquid explosives, 8:54817 (RA;US)
Mohler, J.M., *See* Stanton, P.L., 8:54852
Mohr, D.H. Jr., Identification and separation of the organic compounds in coal-gasification condensate waters, 8:53371 (R;US)
Mokhov, N.V., *See* Maslov, M.A., 8:54606
Molodtsov, A.D., *See* Kuznetsov, V.S., 8:53916
Momeni, M.H., Use of PRIM code to analyze potential radiation-induced genetic and somatic effects to man from Jackpile-Paguate mines, 8:55030 (RA;US)
Moncouyoux, J.P., *See* Bonniaud, R., 8:53605
Mongkolphantha, S., *See* Jingjit, M., 8:54296
See Nouchpramool, S., 8:54297
See Sinakhom, F., 8:54295
Monsler, M.J., Secret high-temperature reactor concept for inertial fusion, 8:55308 (R;US)
Monteagudo, P., *See* Maurin, C., 8:54800
Montemayor, A.F., Evaluation of four lubricants using a modified Federal Test Method 354 test procedure. Interim report August 80-December 80, 8:54194 (R;US)
Month, M., Resonance behavior in the presence of space charge, 8:54575 (R;US)

Montry, G.R., Using inner-shell x-rays as an ion-beam diagnostic, 8:55301 (R;US)
Moore, E.B., Decommissioning of multiple-reactor stations: facilitation by sequential decommissioning, 8:54012 (RA;US)
See Ludwick, J.D., 8:53633
Moore, K.J., Photochemistry of mixed-metal bimetalic complexes containing pentacyanoferrate(II) or pentaammineruthenium(II) metal centers. Evidence for some intramolecular energy-transfer reactions, 8:54340 (J;US)
Moore, M., Workshop on the derivation of average resonance parameters, 15-16 Oct 1981, Saclay (France), 8:55200 (J;XN)
Moore, M.L., Safety analysis of modifications to upgrade the reactor ventilation system at Armed Forces Radiobiology Research Institute. Technical report, 8:53954 (R;US)
Moore, N.L., State-of-the-art of furnace recuperation in the primary metals industry: technical briefing report, 8:54174 (R;US)
Moore, R.L., Design concept for a defense high-level waste shipping cask: truck, 8:54421 (RA;US)
Moorhead, A.J., *See* Morgan, C.S., 8:54261
Morales, J.C., *See* Bedate, C.A., 8:53781
Moretti, A., Radio-frequency quadrupole resonator for linear accelerator, 8:54567 (P;US)
Morgan, C.S., Thermal-shock resistant alumina-metal cermet insulators, 8:54261 (J;US)
Morgan, M.V., *See* Samet, J.M., 8:55033
Morgenstern, R.D., *See* Dubinsky, R., 8:54141
Mori, H., *See* Fujita, H., 8:54234
Morikawa, C.Y., Energy-conservation programs: Building Dept., Building Dept., City and County of Honolulu, 8:54179 (RA;US)
Morin, F.G., Carbon-13 magnetic resonance of hydroaromatics. 2. Conformation of tetralin and tetrahydroanthracene and their methyl derivatives, 8:54327 (J;US)
Moroney, J.R., Environmental radiation at the Monte Bello Islands from nuclear weapons tests conducted in 1952 and 1956, 8:54919 (R;AU)
Preparation of ultra-thin sources and calibration standards for coincident studies, at high resolution, of radiations emitted by the heavy elements, 8:55210 (RA;AU)
See Burns, P.A., 8:54665
Morozov, B.V., *See* Kanavets, V.P., 8:54692
Morris, J.W. Jr., *See* Ogawa, R., 8:54219
Morris, N.D., Examination of the distribution of patient doses from diagnostic x-ray procedures, 8:55002 (R;AU)
Multiplying factors used for the calculation of effective dose equivalent, 8:55209 (RA;AU)
See Hargrave, N.J., 8:55208
Morris, V.R., *See* Landolt, R.R., 8:53685
Morrison, E.D., Interconversion of methylene and ketene ligands on a triosmium cluster. Crystal and molecular structure of the ketene complex $Os_3(CO)_{12}(eta^3(C,C,\mu\text{-}CH_2CO)$, 8:54329 (J;US)
Morrison, K., *See* Sung, N.W., 8:54197
Morton, J.S., *See* Markham, O.D., 8:54930
Morton, T.R., Utility-scale wind energy and the Kahuku wind-energy project, 8:53845 (RA;US)
Moskowitz, P.D., Health and environmental effects document for photovoltaic energy systems, 1982, 8:53788 (R;US)
Moss, J.G.G., *See* Campbell, J., 8:53803
Moss, J.M., *See* McClelland, J.B., 8:55176
Moss, R., Kahauale'a Geothermal Project, 8:53831 (RA;US)
Motley, R.W., Plasma sweeper, 8:55253 (P;US)
Moulard, H., Critical conditions for shock initiation of detonation by small projectile impact, 8:54812 (RA;US)
Moutonnet, P., Heavy water tracing of soil-water transfers under irrigation, 8:54964 (J;US)
Moya, J., *See* Yoshimura, H.R., 8:54443
Moyer, R.O. Jr., *See* Zhuang, J., 8:54241
Mozhaev, A.A., *See* Gavrilin, V.A., 8:53936
Mrochek, J.E., *See* Dinsmore, S.R., 8:53382
Mubarak, M.A., Code of practice against radiation hazards at PINSTECH, 8:55213 (R;PK)
Muehlehner, G., Positron ring system using one-dimensional Anger-type detectors. Progress report, January 1, 1983-December 31, 1983, 8:54676 (R;US)
Mueller, G., *See* Thumm, M., 8:55276
Muga, B.J., Review and evaluation of oil spill models for application to North Carolina waters. Final report, 8:54944 (R;US)
Mulholland, G.P., *See* Grothus, M.A., 8:54768
Muller, R.H., Fast, self-nulling spectroscopic ellipsometer: instrumentation and application. Revision, 8:54765 (R;US)
Muller, S.M., *See* Checkoway, H., 8:55008
Mulligan, W.J., *See* Temkin, R.J., 8:54555
Mullins, L.J., Pyrochemical process for extracting plutonium from an electrolyte salt, 8:54243 (P;US)
Mulloney, J.A. Jr., Brewing industry potential for the immediate and near-term production of fuel-grade ethyl alcohol. Final report, 8:53743 (R;US)
Mulvihill, R.J., Heber Geothermal Binary Demonstration Project. Final design availability assessment. Revision 1, 8:53834 (R;US)
Muminov, M.M., *See* Grishin, V.G., 8:55174
Mummery, G.B., 20 years experience of large-scale movement of irradiated fuel by the CEGB, 8:53564 (RA;US)
Munro, N.B., *See* Witschi, H.R., 8:53424
Murakami, H., Measurement of the radioactive aerosol diameter by position sensitive detectors, 3, 8:54734 (R;JP;In Japanese)
Murata, N., Derivation of Pal-Bell equations for two-point reactors, and its application to correlation measurements at KUCA, 8:53919 (RA;JP;In Japanese)
Murch, G.E., Computer simulation of the vacancy-wind effect in a concentrated alloy with long- and short-range order, 8:54250 (J;GB)
Murchland, P.J., *See* Daugherty, J.M., 8:54195
Murphy, D.W., *See* Ballou, J.E., 8:55064
Murphy, E.S., Post-accident cleanup and decommissioning of a reference pressurized water reactor, 8:54013 (RA;US)
Murphy, J., *See* Wight, A., 8:53536
Murphy, J.R., Magnitude/yield variability in the western United States: analysis of the Rulison/Gasbuggy anomaly. Final report 1 Dec 81-30 Nov 82, 8:54869 (R;US)
Murphy, L.P., *See* Fernandez, S.J., 8:53647
Murphy, S., *See* Ouimette, D.R., 8:55036
Murray, W.E. Jr., *See* Rinsky, R.A., 8:55010
Murrell, M.T., *See* Benjamin, T.M., 8:55094
Murtagh, M.J., *See* Ahrens, L.A., 8:55127
See Gordon, H.A., 8:54728
Murtagh, S.J., *See* Ahrens, L.A., 8:55127
Murzin, V.S., *See* Grishin, V.G., 8:55173
Musalova, L.M., *See* Grishin, V.G., 8:55174
Mutou, M., Calibration of the energy indicator system of INS 1.3 GeV electron synchrotron, 8:54609 (R;JP;In Japanese)
See Noda, A., 8:54582
Myers, T.F., Effect of base gaps on setback-shock sensitivities of cast composition B and TNT as determined by the NSWC setback-shock simulator, 8:54855 (RA;US)

N

N'yuyan, N.D., *See* Bechvarzh, F., 8:55186
Nagaev, V.I., *See* Mal'tsev, I.G., 8:54563
See Mazurov, E.V., 8:54562
Nagahama, H., *See* Yokoyama, H., 8:54418
Nagakura, I., Beryllium window for synchrotron radiation, 8:54617 (R;JP;In Japanese)
Nagel, D.M., *See* Daugherty, J.M., 8:54195
Naito, F., Study of fine dE/dX sampling with a longitudinal drift chamber, 8:54686 (R;JP)
Najdin, Yu.V., *See* Gavrilin, V.A., 8:53936
Najmabadi, F., Parameter optimizations of multiple-mirror reactors, 8:55318 (J;AT)
Nakai, K., Migration of interstitials in βNb-Zr alloys during electron irradiation by using a high voltage electron microscope, 8:54229 (RA;US)
Nakajima, T., *See* Sakai, T., 8:53506
Nakajima, Y., Vacuum system of tandem type electrostatic accelerator of Kyushu University, 8:54615 (RA;JP;In Japanese)
Nakamoto, A., *See* Murakami, H., 8:54734
Nakamura, C.T., Energy conservation in State buildings, 8:54130 (RA;US)
Nakanishi, H., *See* Ishimaru, H., 8:54641

Nakanishi, T., Measurement of the RF field on RFQ linac model cavities, 8:54581 (R;JP)
See Arai, S., 8:54564
Nakano, M., Operating experiences and present activities of JOYO, 8:53969 (R;JP)
Nakata, K., *See* Doke, T., 8:54733
Nakazawa, S., *See* Maki, Y., 8:54459
Namenson, A.I., *See* Stolovy, A., 8:54791
Nanasyan, A.S., *See* Vasinyuk, I.E., 8:54678
Nandakumar, A.N., *See* Vohra, K.G., 8:53702
Nansteel, M.W., *See* Bauman, F., 8:54139
Naqvi, S.J., Evaluation of the use of concrete casks for irradiated fuel management, 8:53596 (BA;XN)
Narain, N.K., Effect of solvent pretreatment on coal liquefaction, 8:53361 (J;US)
Narasimham, T.N., *See* Rasmuson, A., 8:53686
Narasimhan, T.N., *See* Newman, S.P., 8:54938
Narayan, J., Development of morphological instability and formation of cells in silicon alloys during pulsed laser irradiation, 8:54289 (J;NL)
See Young, R.T., 8:53764, 8:54283
Narushima, K., *See* Ishimaru, H., 8:54641
Nash, K.E., *See* Gavin, M.E., 8:54430
See Taralis, D., 8:54436
Nater, K.D., *See* Abraham, S., 8:55334
Naus, D.J., Prestressed concrete reactor vessel research and development studies at the Oak Ridge National Laboratory, 8:53891 (BA;GB)
Nebeker, E.B., Development of large-diameter percussive jets, 8:54489 (BA;US)
Nebel, D., Annual report 1981. Nuclear Fuel Research Department, 8:54205 (R;DD;In German)
Neckers, D.C., Photochemical cycloadditions of 2,3-dihalobenzo[b]thiophenes: stereochemical and mechanistic results, 8:53740 (J;US)
Neef, R.D., Detection of flux perturbations in pebble bed HTGRs by near core instrumentation, 8:53883 (R;XA)
Neek, D., *See* Berry, H.G., 8:55108
Neely, N., Remedial actions at hazardous waste sites: survey and case studies. Final report, 8:54942 (R;US)
Nehnevajsa, J., Some ecological contexts of attitudes concerning issues of civil defense. Final report, 8:55348 (R;US)
Neighbours, J.R., Free electron laser research in Europe. Technical report, 8:54502 (R;US)
Neill, D.R., Overview of Hawaii's wind-energy program, 8:53842 (RA;US)
Neill, R.H., Potential problems from shipment of high-curie content contact-handled transuranic (CH-TRU) waste to WIPP, 8:53580 (R;US)
Nelsen, J., *See* Trujillo, A.A., 8:54451
Nelsen, J.M., Analytical/experimental program to assess thermal response to geometrically simulated casks to engulfing fires, 8:54440 (RA;US)
Nelson, J.B., Studies on the properties of hard-spectrum, actinide fissioning reactors. Final report, 8:53913 (R;US)
Nelson, J.D., Consolidation of tailings, 8:53654 (R;US)
Design considerations for long-term stabilization of uranium mill tailings impoundments, 8:53655 (R;US)
Nemeth, I., *See* Andrasi, A., 8:54925
Nemethy, P., *See* Loken, S.C., 8:54706
See Oddone, P, 8:54651
Neretnieks, *See* Rasmuson, A., 8:53686
Ness, J.C., Computer program for performance and sizing analysis of compact counter-flow plate-fin heat exchangers. Research and development report, 8:54517 (R;US)
Nesslage, G.V., Interface formation in physically deposited films, 8:54236 (R;US)
Nesterenko, V.V., Relativistic string theory and nonlinear two-dimensional sigma-model, 8:55150 (R;SU)
Nesterov, V.M., *See* Kanavets, V.P., 8:54692
Neton, J.W., *See* Cohen, N., 8:55050
Neumann, A.T., *See* Sherman, G. Jr., 8:53872
Newcombe, R., Review of coal-supply models and forecasts: a critique of the current state-of-the-art, 8:54090 (R;US)
Newman, S.P., Adaptive explicit-implicit quasi three-dimensional finite element model of flow and subsidence in multiaquifer systems, 8:54938 (J;US)
Newnam, B.E., *See* Warren, R.W., 8:54511, 8:54513
Newton, G.J., Aerosols from metal cutting techniques typical of decommissioning nuclear facilities - experimental system for collection and characterization, 8:53691 (RA;US)
See Hoover, M.D., 8:53690
Nexsen, W.E., *See* Calderon, M.O., 8:55311
Niarchos, D., *See* Shenoy, G.K., 8:54288
Nichols, D.K., *See* Price, W.E., 8:54759, 8:54760
Nicholson, N., *See* Caldwell, J.T., 8:53475
Nickell, R., *See* McConnell, P., 8:54428
Nickell, R.E., Design of radioactive material shipping packaging for low-velocity puncture resistance, 8:54388 (RA;US)
Design rules for containment systems of nuclear spent fuel and high-level waste transport packagings, 8:53570 (RA;US)
See Goldmann, K., 8:53568
See Osborne, D.M., 8:54450
Nicklow, R.M., *See* Kamitakahara, W.A., 8:54253
Nielsen, R.A., *See* Fernandez, S.J., 8:53647
Nikolenko, V.G., Differential neutron scattering cross sections and average neutron parameters of tin isotopes, 8:55187 (R;SU;In Russian)
Nikolina, A.A., *See* Krumshtejn, Z.V., 8:54697
Nikowitsch, P., *See* Held, M., 8:54843
Nishihara, M., *See* Endo, T., 8:53875
Nishikawa, A., *See* Onodera, A., 8:54463
Nishina, K., *See* Murata, N., 8:53919
Nishino, S., Ultrasonic testing of austenitic stainless steel welds, 8:54541 (R;JP)
Niszcz, R., *See* Strugalski, Z., 8:55185
Nix, J.R., *See* Krumlinde, J., 8:55189
Noakes, D.R., *See* Shenoy, G.K., 8:54288
Noda, A., Coherent instability of the heavy ion beam in the storage ring, 8:54637 (RA;JP)
Measuring system of multipole fields of the quadrupole magnet in drift-tubes of a linear accelerator, 8:54582 (R;JP)
Nogar, N.S., *See* Miller, C.M., 8:54304, 8:55116
Noger, M.C., Tar-sand resources of western Kentucky, 8:53450 (RA;US)
Noguchi, H., *See* Nomura, Y., 8:54460
Noguchi, S., *See* Onimura, K., 8:54540
Nolan, D.J., Analysis method for the design of transport packagings shock absorbing end covers, 8:54468 (RA;US)
TN-12Y packaging for rail transport of irradiated fuel, 8:54433 (RA;US)
Noland, R.A., *See* Rhude, H.V., 8:54020
Nomura, Y., Safety analysis code systems for spent fuel cask in JINS, 8:54460 (RA;US)
Norgren, D.U., Braking system, 8:54485 (P;US)
Northcutt, W.G., *See* Wallace, S.A., 8:53687
Nouchpramool, S., Development of an analytical technique for the determination of traces of cadmium by substoichiometric isotope dilution technique, 8:54297 (R;TH;In Thai)
Nourbakhsh, S., *See* Hascicek, Y.S., 8:54476
Novaro, M., *See* Friart, D., 8:55259
Novokshchenova, E.A., *See* Gavrilin, V.A., 8:53936
Novotny, J.F., *See* Walburg, C.H., 8:53755
Nozdrin, A.A., *See* Antipov, Yu.M., 8:54698
Nuff, G.A., Stirred autoclave apparatus for study of the Fischer-Tropsch synthesis in a slurry bed. 2. Analytical procedures, 8:54316 (J;US)
Nur, A., *See* Potter, J., 8:53841
Nurgozhin, N.N., *See* Aksinenko, V.D., 8:54699
Nuttli, O.W., *See* Mitchell, B.J., 8:54872
Nye, A.H., Dynamical phenomena in sunspots. Final report 1 Mar-31 Jul 82, 8:55086 (R;US)
Nygren, D.R., Large solid angle solenoid spectrometer with particle identification by dE/dx, 8:54723 (RA;US)
Particle identification, 8:54711 (RA;US)

O

O'Brien, R.E., *See* Hittle, D.C., 8:54128
O'Brien, R.S., *See* Leach, V.A., 8:53467
O'Donnell, W.R., *See* Olthof, M., 8:53383
O'Hagan, J.B., *See* Bacon, F.M., 8:55119
O'Keefe, G.B., *See* Rhude, H.V., 8:54020
Obenschain, S.P., *See* Grun, J., 8:55257
See Rosen, M.D., 8:55315
See Stamper, J.A., 8:55256
Obst, J., *See* Viecenz, H.J., 8:54018
Oddone, P, Research and development program on dense TPC's at LBL, 8:54651 (RA;US)
Odintsov, V.G., Generalized formulas for determining kinematic parameters of charged particle tracks with the account of total error matrix in

factorized representation, 8:54694 (R;SU;In Russian)
Odo, T., *See* Miyazawa, T., 8:53977
Oertel, G.K., Waste management impacts of US decommissioning activities, 8:53610 (RA;US)
Oesterreicher, H., Metal hydride catalysis: water formation on exposure of $LaCo_5H$/sub z/ to O_2, 8:54312 (J;US)
Oganesyan, K.O., *See* Gornov, M.G., 8:55188
Ogawa, R., Influence of alloy composition on the cryogenic mechanical properties of AISI 200 grade high-manganese austenitic steels, 8:54219 (R;US)
Oguma, R., Investigation of the resonant power oscillation in the Halden Boiling Water Reactor by autoregressive modeling, 8:53870 (RA;JP;In Japanese)
Ohashi, K., *See* Hosokawa, T., 8:54545
Ohshima, T., *See* Mutou, M., 8:54609
See Naito, F., 8:54686
Ohta, T., Computer simulation of the heating effect on mirrors by synchrotron radiation, 8:54644 (R;JP)
Ohtake, T., *See* Miyakawa, S., 8:53972
Ohtani, H., Reactor noise analysis of experimental fast reactor 'JOYO', 8:53899 (RA;JP;In Japanese)
Oicles, J.A., Low-jitter, hydrogen thyratron Pockels cell driver, 8:55309 (R;US)
Oka, Y., *See* Hashikura, H., 8:53976
Okano, T., Simulation of acoustic delay line (ADL) system for light pipe in the radiated light facility by computer and analog circuits, 8:54549 (RA;JP;In Japanese)
Okumura, K., Experimental studies on the production of ultra cold neutrons by using an accelerator neutron source, 8:53732 (R;JP;In Japanese)
Okuno, H., *See* Naito, F., 8:54686
Okura, G.N., *See* Chapman, G.A., 8:54093
Oler, J.W., Dynamic-stall regulation of the Darrieus turbine, 8:53852 (R;US)
Oleszkiewicz, J., *See* Olthof, M., 8:53383
Olsen, A.R., *See* Tolley, H.D., 8:54982
Olsen, J.N., Ion stopping in heated targets, 8:55302 (R;US)
See Mehlhorn, T.A., 8:55304
Olson, H.H., *See* Gates, B.C., 8:53366
Olson, J.M., Solar production of hydrogen. A biological approach, 8:53736 (J;US)
Olson, W.P., Electric fields in earth orbital space. Annual report, 8:55089 (R;US)
Olthof, M., Treatment of coke plant wastewaters in packed bed reactors, 8:53383 (R;US)
Omel'yanenko, A.A., *See* Golovin, V.M., 8:54585
Omoti, U., Root activity, 8:54996 (RA;XA)
Studies using ^{32}P to determine the distribution and activity patterns of the oil palm root system in Nigeria, 8:54993 (RA;XA)
Onimura, K., Studies on analytical method and nondestructive measuring method on the sensitization of austenitic stainless steels, 8:54540 (R;JP)
Onodera, A., Operational experience with the HZ-75T spent fuel shipping cask, 8:54463 (RA;US)
See Ebisu, T., 8:54412
Opsal, J.L., *See* Rose, J.H., 8:54532, 8:54534
Orcutt, J.A., Gnome site decontamination and decommissioning project, 8:53618 (RA;US)
Orsini, A., Planning of railway transport of radioactive materials as a consequence of the public concern: the role of competent authority, 8:53512 (RA;US)
See De Marco, I., 8:53703
Osanai, M., JPDR decommissioning program, 8:54002 (RA;US)
Osborne, D.M., Two- and three-dimensional dynamic analyses of DHLW casks, 8:54450 (RA;US)
Oshima, H., Development of plutonium oxide power packaging (PUCON type packaging), 8:54397 (RA;US)
Ososkov, G.A., *See* Dvurecenskij, A., 8:54701
Ospina, C., Intermediate dry storage of the spent fuel of reactor DIORIT, 8:53593 (BA;XN)
Planning and experience on the dry storage of Diorit spend fuel, 8:53493 (RA;US)
Oster, Z.H., *See* Som, P., 8:54969
Ott, L.J., *See* Harrington, R.M., 8:54029
Ouimette, D.R., Cancer incidence study in Mesa County, Colorado, 8:55036 (RA;US)
Ouyang, F., *See* Levenspiel, O., 8:53776
Overton, W.C. Jr., *See* Barclay, J.A., 8:54475
Owen, M.L., *See* Hargrove, O.W. Jr, 8:53391, 8:53392
Owens, E.C., *See* Montemayor, A.F., 8:54194
Ozaki, S., *See* Onodera, A., 8:54463
Ozaki, Y., *See* Araki, H., 8:53946

P

Packer, S., *See* Lambrecht, R.M., 8:54977
Padgett, H.C., *See* Barrio, J.R., 8:54348
Padula, D.A., Isotopic analysis of radioactive waste packages (an inexpensive approach), 8:53638 (RA;US)
Paeye, G., Tubular cell solar collector, 8:53821 (P;FR;In French)
Page, T.L., *See* Henager, C.H., 8:53869
Pages, P., *See* Hubert, P., 8:53694
Painter, L.R., Photoemission yields of liquids in the vacuum ultraviolet, 8:55114 (R;US)
Painter, P.C., *See* Davis, A., 8:53399
Palacios, E., Optimization of radiation protection in the transportation of radioisotopes, 8:53693 (RA;US)
Panchal, C.B., *See* Hillis, D.L., 8:53794
Pang, P.C.K., Nitrogen fixation by cover crops, 8:54991 (RA;XA)
Uptake of ^{15}N labelled urea and ammonium nitrate by 4-year old Douglas-fir grown in sand-peat mix, 8:54986 (RA;XA)
Pankaskie, P.A., *See* Johnson, A.B. Jr., 8:53590
Pansky, S.H., Energy strategy selector for small office building design, 8:54145 (R;US)
Papanicolaou, E., Fertilizer use efficiency, 8:54988 (RA;XA)
Papanicolaou, E.P., Olive and citrus tree crops and their fertilization in Greece: Field studies with ^{15}N labelled fertilizers, 8:54985 (RA;XA)
Paramore, B., *See* Burgy, D., 8:53944, 8:53945
Pardini, J.A., Sealing coupling, 8:53905 (P;US)
Park, J.E., *See* Giles, G.E., 8:54138
Parkinson, B.A., Semiconductor liquid-junction solar cell, 8:53786 (P;US)
Parks, C.V., Standaridized analyses of nuclear shipping containers, 8:54461 (RA;US)
Parks, G., *See* Potter, J., 8:53841
Partom, Y., Void collapse model for shock initiation, 8:54823 (RA;US)
Pascali, R., *See* Agostinelli, A., 8:53999
Pasternack, B.S., *See* Harley, N.H., 8:55012
Pastine, D.J., *See* Frankel, M.J., 8:54824
Patterson, D.J., *See* Sung, N.W., 8:54197
Patterson, S.R., *See* Donaldson, R.R., 8:54478
See Roblee, J.W., 8:54479
Paul, A.C., Trace metals in tropical river environment--distribution, 8:54945 (J;NL)
Trace metals in tropical river environment--speciation and biological transfer, 8:54946 (J;NL)
Variable-emittance filter for the Electron Laser Facility, 8:54594 (R;US)
Paul, S., *See* Chaisse, F., 8:54836
Paur, R.J., *See* Shaw, R.W., 8:54901, 8:54902
Pavlinov, A.I., *See* Akimenko, S.A., 8:54682
Pavlinov, L.V., Impurities diffusion in uranium: cobalt diffusion, 8:54212 (R;SU;In Russian)
See Gladyshev, A.M., 8:54213
Pawlak, T., *See* Strugalski, Z., 8:55184
Pawlewicz, W.T., Microstructure control for sputter-deposited ZrO_3, ZrO_2 CsO and ZrO_2 Y_2O_3, 8:54262 (J;CH)
Pearlstein, L.D., Ion microstability in tandem mirrors, 8:55250 (R;US)
Three-dimensional equilibrium in quadrupole symmetric tandem mirrors in the paraxial limit (reduced MHD), 8:55249 (R;US)
Pearsall, E.S., IDA/BPT crisis relocation planning model: description, documentation and user's guide to the computer program. Final report, 8:55345 (R;US)
Pearson, J.D., Environment, safety, and health annual report, fiscal year 1982, 8:53425 (R;US)
Pechkurov, V.A., *See* Gornov, M.G., 8:55188
Pecina, R.J., Assessment of gamma-inject logging techniques for the determination of residual oil saturation. Final report, 8:53431 (R;US)
Pedersen, R.A., *See* Spindle, A., 8:55060
Peeha, M., *See* Kaspar, G., 8:53589
Peek, J.M., *See* Mehlhorn, T.A., 8:55304
Peelle, R.W., Annotated bibliography covering generation and use of evaluated cross section uncertainty files, 8:55160 (R;US)

Pehl, R.H., *See* Friesel, D.L., 8:54748
Peise, G., *See* Althoff, M., 8:55136
Pelizzetti, E., *See* Matheson, M.S., 8:53735
Pelletteri, M.L., *See* Som, P., 8:54969
Pellettieri, M.W., *See* Welles, B.W., 8:53515, 8:53537
Peloquin, R.A., *See* Baker, D.A., 8:53952
See Kennedy, W.E. Jr., 8:53677
Pelton, A.R., Effects of HVEM irradiation on ordered phases in Ni-Ti, 8:54220 (RA;US)
Peng, Y.K.M., *See* Iida, H., 8:55237
Peoples, J., *See* Cumalat, J., 8:55137
Pepelyshev, Yu.N., *See* Vagov, V.A., 8:53940
Peppas, N.A., Macromolecular structural changes in bituminous coals during extraction and solubilizatio. Final technical report, September 1, 1980-August 31, 1983, 8:53369 (R;US)
Perala, R.A., *See* Cuneo, A.A. Jr., 8:54757
Percival, C.M., *See* Bennett, R.H., 8:54769
Percivall, G.S., *See* Hittle, D.C., 8:54128
Perdue, P.T., *See* Goldsmith, W.A., 8:54900
Peresypkin, A.I., *See* Datsko, V.S., 8:54681
Perfeev, V.N., *See* Zabolotin, V.P., 8:54584
Perona, J.J., *See* Counce, R.M., 8:53476
Peroni, P., *See* Cuzzaniti, M., 8:53585
Perry, F.C., *See* Burns, E.J.T., 8:55300
See Dreike, P.L., 8:55299
Perry, P.E., *See* Moskowitz, P.D., 8:53788
Persson, A., Thermal explosion hazard of thin layers of gelatine dynamite, 8:54790 (RA;US)
Persson, P.O.G., *See* Baker, R.W., 8:53843, 8:53844
Perveen, N., Levels of strontium 90 in the environment at PINSTECH (Period 1979-1980), 8:54927 (R;PK)
Peryt, W., *See* Strugalski, Z., 8:55185
Petchell, R., *See* Leach, V.A., 8:53467
Peter, K.G., Development of a new DOT-7A, Type A corrugated metal waste container at the Rocky Flats Plant, 8:54398 (RA;US)
Petersen, H., *See* Green, M.A., 8:54477
Petersen, J.D., *See* Moore, K.J., 8:54340
Peterson, B.E., *See* Joy, D.S., 8:53579
Peterson, G.L., *See* Burr, J.R., 8:53648
Peterson, H.T. Jr., *See* Goldsmith, R., 8:55023
Peterson, J.M., *See* Gilbert, T.L., 8:53611
See Hussey, M.W., 8:54420
Peterson, R.W., Estimated transportation cost and risk for operation of a nuclear waste repository at candidate sites, 8:53555 (RA;US)
See Varadarajan, R.V., 8:53641
Peterson, S.R., Predictive geochemical modeling of interactions between uranium-mill-tailings solutions and sediments in a flow-through system: model formulations and preliminary results, 8:54926 (R;US)
Peterson, W.J., Laterally bendable belt conveyor, 8:54484 (P;US)
Petrakis, L., *See* Gates, B.C., 8:53366
Petrie, L.M., *See* Parks, C.V., 8:54461
Petronzio, R., Hadron physics at the workshop, 8:55132 (RA;XC)
Petrukhin, A.I., *See* Antipov, Yu.M., 8:54698
Petrukhin, V.I., *See* Krumshtejn, Z.V., 8:54697
Petsonk, L., Effects of added resistance to breathing in obstructed lung disease. Phase 1, 8:54975 (R;US)
Petty, S.E., Preliminary assessment of the use of heat transfer fluids for solar thermal energy systems. Final report May 81-Apr 82, 8:53763 (R;US)
Pezuela, P., Photovoltaic conversion of solar energy, 8:53780 (R;US)
Pfannkuch, H.O., Hydrocarbon spills, their retention in the subsurface and propagation into shallow aquifers, 8:54943 (R;US)
Pfitzer, K.A., *See* Olson, W.P., 8:55089
Pflugrad, K., *See* Price, M.S.T., 8:54429
Phelps, M.E., *See* Barrio, J.R., 8:54348
Phillion, D.W., *See* Rosen, M.D., 8:55315
Phillip P.C., *See* Pollack, R.W., 8:55056
Phillips, D.S., Climb dissociation of <1010> dislocations in sapphire (α-Al_2O_3), 8:54264 (J;GB)
Phillips, N.E., *See* Mayberry, M.C., 8:54764
Pichugin, A.P., *See* Gornov, M.G., 8:55188
Pickel, F.H., Cogeneration and utility planning. Final report, 8:54187 (R;US)
Pickles, W.L., *See* Calderon, M.O., 8:55311
Piemontese, L., *See* Bovet, C., 8:54672
Pierce, D.A., *See* Land, C.E., 8:55007
Pierce, S.R., *See* Barkhordar, P.M., 8:54164
Piermattei, S., *See* De Marco, I., 8:53490
Pikel'ner, L.B., *See* Alfimenkov, V.P., 8:55180
Pilarski, D.L., *See* Boyle, V.M., 8:54854
Pilkey, R.D., Gauge block lasometer development, 8:54770 (R;US)
Pillai, K.C., *See* Paul, A.C., 8:54945, 8:54946
Pinder, J.E. III, *See* Adriano, D.C., 8:54931
See Corey, J.C., 8:54929
Pipa, A.V., *See* Bomko, V.A., 8:54565
Pittion-Rossillon, G., *See* Chirat, R., 8:54838
Placci, A., *See* Bovet, C., 8:54672
Placidi, M., *See* Bovet, C., 8:54672
Plomp, P.W., Computerized manufacturing: the impact of high technology implication for the work force, 8:55340 (R;US)
Plonski, B., *See* Vigil, M.G., 8:54424
Pluta, J., *See* Strugalski, Z., 8:55184, 8:55185
Plyaskin, V.I., *See* Bychkov, V.M., 8:55199
Poff, K.L., *See* Schneider, M.J., 8:55067
Pollack, R.W., Sterilization of TLD finger monitors, 8:55056 (J;GB)
Pollmann, E., *See* Baran, A., 8:53704
Ponce, F.A., *See* Smith, D.J., 8:54278
Pope, B., Calorimetry, 8:54709 (RA;US)
Pope, M.D., *See* Kern, E.C. Jr., 8:53790
Pope, R.B., *See* Diggs, J.M., 8:54391
See Gablin, K.A., 8:54426
See Romesberg, L.E., 8:54400
Popov, A.B., *See* Nikolenko, V.G., 8:55187
Popov, Yu.P., *See* Bechvarzh, F., 8:55186
See Gledenov, Yu.M., 8:55178
Porile, N.T., Fragment emission in reactions of 18.5 GeV ^{12}C ions with complex nuclei, 8:55179 (RA;FR)
Porokhovoj, S.Yu., *See* Gornov, M.G., 8:55188
Porter, D.L., Neutron irradiation and compatibility testing of Li_2O, 8:55283 (R;US)
Porter, G., MFTF-B quasi-control ECRH transmission system/waveguide transmission system for TMX-U, 8:55268 (RA;US)
Porter, J., *See* Reimers, R.M., 8:54620
Porter, L.F., *See* Bennett, B.I., 8:54904
Posner, G.H., *See* Seliger, H.H., 8:54342
Post, R.F., Plasma physics. Report on the 1982 international conference, Goeteborg, Sweden, 9-15 June 1982, 8:55252 (J;AT)
Poston, J.W., *See* Goldsmith, W.A., 8:54900
Pototskaya, N.N., *See* Datsko, V.S., 8:54681
Potter, I.N., United kingdom solar pilot test facility. the design, construction and first phase of operation. Final report, 8:53807 (R;US)
Potter, J., Improvements in geothermometry. Final technical report. Rev., 8:53841 (R;US)
Pouard, P., *See* Chevalier, G., 8:54392
Poulard, S., *See* Brosse, J.M., 8:54858
Prasad, D.R., Electron-transfer quenching vs. exciplex-mediated quenching of the low-lying excited states in phthalocyanines, 8:54315 (J;US)
Prausnitz, J.M., Phase equilibria for complex fluid mixtures, 8:53372 (R;US)
Preece, D.S., *See* May, R.A., 8:54444
Preller, C., *See* Newman, S.P., 8:54938
Prendergast, J.T. Jr., Decommissioning alternatives for Savannah River Plant high-level waste tank 16, 8:53631 (RA;US)
Presles, H.N., Influence of additives on nitromethane detonation characteristics, 8:54829 (RA;US)
Pretzsch, G., Calculation of the neutron sensitivity of thermoluminescent detectors. 4. Lithium fluoride albedo dosemeter, 8:54741 (R;DD;In German)
Model for calculating the neutron sensitivity of organic solid-state track detectors, 8:54745 (R;DD;In German)
Study of the properties of cellulose triacetate foils used as solid-state track detectors for neutrons, 8:54743 (R;DD;In German)
Price, C.F., *See* Boggs, T.L., 8:54804
Price, J.D., *See* Wan, E.I., 8:53774
Price, M.S.T., Large transport containers for nuclear reactor decommissioning waste, 8:54429 (RA;US)
Price, R.H., *See* Rosen, M.D., 8:55315
Price, W.E., Total-dose radiation-effects data for semiconductor devices. Vol. 1, 8:54759 (R;US)
Total-dose radiation-effects data for semiconductor devices. Vol. 2, 8:54760 (R;US)
Prichard, A.W., *See* Nelson, J.B., 8:53913
Prichard, H.M., Sampling strategies for indoor radon investigations, 8:54897 (RA;US)
Priest, A.H., Fatigue crack growth and fracture resistance of steels in high-pressure hydrogen environments. Final report, 8:54211 (R;XE)
Prikhod'ko, E.D., *See* Datsko, V.S., 8:54681

Probst, U., *See* Droste, B., 8:54385, 8:54434
See Wieser, K.E., 8:54457
Prodell, A., *See* Herrera, J., 8:54632
Prosin, B.V., *See* Bryukhanov, N.S., 8:54684
Pryor, W.A., Packaging of US Department of Energy toll enriched UF_6: experience, responsibilities, and improvements, 8:54464 (RA;US)
Psaraftis, H.N., *See* Kondratowicz, L.J., 8:53442
Pshenichnyj, V.A., ASSEMBLER program group for preliminary data processing on-line with ES-1010, 8:55337 (R;SU;In Russian)
Puchta, H., *See* Jaeaeskelaeinen, M., 8:55192
Puga, L.C., Studies of solar Ca K plages and UV, X-ray and 10 cm variations. Technical memo, 8:55096 (R;US)
Pugh, H.G., *See* Renfordt, R.E., 8:55194
Pugh, H.L., Thermal decomposition of RDX below the melting point, 8:54793 (RA;US)
Pugmire, R.J., Application of 2-D and dipolar dephasing ^{13}C NMR techniques to the study of structural variations in coal macerals, 8:53375 (J;US)
See Alemany, L.B., 8:54334, 8:54335
See Meuzelaar, H.L.C., 8:53359
See Morin, F.G., 8:54327
Puliti, P., *See* Boeuf, A., 8:54238
Pullen, E.J., *See* Ford, J.C., 8:54939
Purohit, G.P., *See* Mulvihill, R.J., 8:53834
Putta, S.N., *See* Sistla, G., 8:54894
Putzier, E.A., *See* Lagerquist, C.R., 8:54922
Puzak, J.C., *See* Bennett, B.I., 8:54904

Q

Quail, P.H., Phytochrome from green plants: assay, purification, and characterization, 8:54963 (R;US)
Quintenz, J.P., *See* Mendel, C.W. Jr., 8:55297
See Sweeney, M.A., 8:55296
Qureshi, I.H., *See* Rehana, I., 8:53471

R

Rable, A., *See* Hassan, M.Y.M., 8:55167
Rabinovich, A.D., *See* Basova, B.G., 8:53967
Rabinowitz, S., *See* Moskowitz, P.D., 8:53788
Radziemski, L.J., Apparatus and method for quantitative determination of materials contained in fluids, 8:54889 (P;US)
Rasvskaya, V.E., *See* Begichev, S.N., 8:53965
Rafalowicz, J.A., Analysis of thermal conductivity data for fourteen elements in normal and superconducting states. State-of-the-art report, 8:54206 (R;US)
Rafelski, J., Perspectives in high energy nuclear collisions, 8:55190 (R;US)
Raffenetti, R.C., Participation of VAX VMS computers in IBM file-transfer networks, 8:55332 (R;US)
Raghavan, S., Characterization and processing of coal fired copper reverberatory flue dusts. Open file report 1 October 80-30 September 82, 8:54172 (R;US)
Rago, C.E., *See* Green, M.A., 8:54477
Rahbar, A., *See* McClelland, J.B., 8:55176
Raines, G.E., *See* Gureghian, A.B., 8:53673
Rainisch, R., Transportation of the reactor vessel/internals of retired nuclear power plants as a single package, 8:53871 (RA;US)
Rajan, J.B., *See* Miller, J.F., 8:54047
Ralph, B.J., *See* Cooper, M.B., 8:54950
Ramakrishna, K., Laminar natural convection along vertical corners, 8:54520 (RA;US)
Ramcke, K., *See* Einfeld, K., 8:53495
Ramey, H.J. Jr., Proceedings of fifth workshop on Geothermal Reservoir Engineering, 8:53837 (R;US)
Ramirez, J.J., IBEX - a pulsed power accelerator that generates no prepulse, 8:54566 (R;US)
Ramos, T.J., Laser cutting nozzle, 8:54515 (P;US)
Ramsey, W.E., Cargo-restraint-transporter (CRT): a proven method of handling drum-type containers on safe-secure trailers (SSTs), 8:53541 (RA;US)
Ramsey, W.J., *See* Stevens, C.G., 8:54341
Rand, P.B., Stabilized aqueous foam systems, concentrate for producing a stabilized aqueous foam and method of producing said foam, 8:53723 (P;US)
Ranjan, R., Life prediction under stress corrosion conditions below K/sub ISCC/, 8:54215 (R;US)
Rankin, R.A., *See* Fernandez, S.J., 8:53647
Rao, P.R., Development of a preasurized fluidized-bed combustor model, 8:54559 (R;US)
Rapoport, H., *See* Schoenleber, R.W., 8:54328
Rasmuson, A., Chemical transport in a fissured rock: verification of a numerical model, 8:53686 (J;US)
Rasmusson, P.C., *See* Osborne, D.M., 8:54450
Raudenbush, M.H., *See* Gilbert, K.V., 8:53554
Rawl, D.E. Jr., *See* Caskey, G.R. Jr., 8:54210
Raynor, G.S., Effects of varying air trajectories on spatial and temporal precipitation chemistry patterns, 8:54895 (J;NL)
Reda, D.C., *See* Gartling, D.K., 8:54524
Reed, G.D., *See* Davis, W.T., 8:53386
Reed, H.C., Compliance training, 8:53574 (RA;US)
See Yarborough, R.D., 8:53526
Reese, J. Jr., Development of mass-producible line-focus tracking concentrating solar collectors - Category 1: collectors. Final report, 8:53819 (R;US)
Reese, R.T., *See* Cashwell, J.W., 8:53556
See Jones, R.H., 8:53499
See Larson, D.W., 8:53576
See Shepherd, E.W., 8:53534
See Shirley, C.G., 8:53514
Regel', V.R., *See* Vorob'ev, E.D., 8:54217
Rehana, I., Emission spectrographic carrier distillation technique for the determination of trace elements in nuclear fuel materials, 8:53471 (R;PK)
Rehbein, D.K., Clamping force of heat-shrinkable fittings, 8:54368 (R;US)
Reidel, S.P., *See* Bergstrom, K.A., 8:53680
Reif, J.S., Canine neoplasia and exposure to uranium mill tailings in Mesa County, Colorado, 8:55034 (RA;US)
Reilly, R.W., Proposed new energy standard for commercial buildings, 8:54144 (R;US)
Reimers, R.M., 344 cm x 86 cm low mass vacuum window, 8:54620 (R;US)
Reinharz, E., Animal-sediment relationships: a case study of the Patapsco River, 8:54955 (R;US)
Reinleitner, L.A., Chorus-related electrostatic bursts at Jupiter and Saturn. Progress report, 8:55091 (R;US)
See Gurnett, D.A., 8:55098
Reisman, A.W., DAMOS: a data and modelling system for energy policy analysis, 8:54083 (R;US)
Rekalo, M.P., P-odd effects for the one-photon mechanism of three-jet e^+e^- -> qanti q + π^{+-} processes, 8:55153 (TJ;DE)
Renavot, J.M., *See* Lauer, H., 8:53494
Renfordt, R.E., Search for flow in the reaction Ar + Pb, 8:55194 (R;US)
Renne, D.S., *See* Sandusky, W.F., 8:53851
Reny, D.A., *See* Mulvihill, R.J., 8:53834
Rescigno, A., Algorithm for reconstruction of count-rate curves from total counts, 8:54291 (R;US)
Resnick, B.S., *See* Dike, D.H., 8:53461
Revenaugh, J., *See* Friedman, A.M., 8:54972
Revitt, D.M., *See* Ellis, J.B., 8:54917
Rey, P.A., Control of blackwater in coal preparation plant recycle and discharge. Open file report Oct 79-Sep 82 (final), 8:53390 (R;US)
Reyes, M., *See* Wilkinson, G.S., 8:55027
Reyes, R., *See* Menossi, C., 8:53491
Reynolds, C.S., *See* McGonnagle, W.J., 8:54731
Rheingold, A.L., *See* Morrison, E.D., 8:54329
Rhoderick, J.E., *See* Burkes, J.P., 8:53645
Rhude, H.V., Fabrication of UO_2-stainless steel fuel for a fast-reactor safety test, 8:54020 (R;US)
Ricco, A.J., *See* Bagilo, J.A., 8:53784
Rice, C.J., *See* Giguere, R.P., 8:54784
Rice, G.W., Direct liquid sample introduction into an inductively coupled argon plasma, 8:54293 (R;US)
Rice, J.K., *See* Riley, M.E., 8:54514
Rice, R.W., Study of factors affecting soot formation in a swirl-stabilized combustor. Final report 22 Jan 80-30 Sep 82, 8:53443 (R;US)
Rich, D.C., *See* Bernhardt, D.E., 8:53632
Rich, F.J., Effect of thermal alteration on petrographic constituents of the Hanna No. I coal, 8:53380 (J;US)
Richards, L.W., Los Angeles field modeling and measurement study - 1976 (first year). Final report, 8:54883 (R;US)
Los Angeles field modeling and measurement study - 1978 (second year). Final report, 8:54884 (R;US)

Richards, M.P., List of DOE radioisotope customers with summary of radioisotope shipments, FY 1982, 8:53731 (R;US)
Richey, W.D., *See* Joshi, J.B., 8:53416
Richmond, J.S., *See* Padula, D.A., 8:53638
Richter, D.D., *See* Johnson, D.W., 8:54909
Ridder, K., Carriage of radioactive substances in Europe in consideration of the provisions of the road traffic law, including the possibilities of taking into account the 1984 version of the IAEA regulations, 8:53483 (RA;US)
Riedle, K., *See* Hein, D., 8:54040
Riesenhuber, H., Political framework conditions of research and technology, 8:54071 (R;DE;In German)
Riess, F., *See* Renfordt, R.E., 8:55194
Rigol', Kh., *See* Gledenov, Yu.M., 8:55178
Riley, M.E., Optical distortion due to gas-dynamic motion in a photolytically pumped cylindrical laser cavity, 8:54514 (J;US)
Rimkus, J., *See* Althoff, M., 8:55136
Rimmer, S.M., *See* Davis, A., 8:53399
Rindo, H., *See* Miyazawa, T., 8:53977
See Sekiguchi, N., 8:53902
See Tamura, S., 8:53971
Ringstad, O., *See* Abdullah, M.I., 8:54947
Rinker, R.G., *See* Datta, R., 8:54320
Rinsky, R.A., Cancer mortality at a naval nuclear shipyard, 8:55010 (RA;US)
Rinta, R.I., *See* Green, M.A., 8:54477
Riordan, C.J., Review of potential satellite techniques for mesoscale mapping of insolation, 8:53759 (R;US)
Ripin, B.H., Laser-plasma interaction experiments and diagnostics at NRL (Naval Research Laboratory). Memorandum report, 8:55254 (R;US)
See Rosen, M.D., 8:55315
See Stamper, J.A., 8:55256
Ritter, P.D., *See* Newton, G.J., 8:53691
Rittscher, D., Low-cost/high-capacity waste casks: the MOSAIK family, 8:53637 (RA;US)
See Lauer, H., 8:53494
Ritz, H.J., *See* Joshi, J.B., 8:53415, 8:53416
Ritzma, H.R., Tar sand resources of Utah, 8:53452 (RA;US)
Riviere, A., Culham ECRH, 8:55238 (RA;US)
Rizkalla, E.N., Nuclear magnetic resonance study of ethylenediaminetetrakis(methylenephosphonic acid) and some metal complexes, 8:54332 (J;US)
Roach, M.S., *See* Kuhna, S.J., 8:53521
Robbins, C.L., Graphical method for determining interflected daylight in clear climates, 8:53758 (R;US)
Roberts, G.L., *See* Lyke, S.E., 8:54115
Roberts, N.J. Jr., Microwaves, hyperthermia, and human leukocyte function. Final report, August 1979-June 1982, 8:55072 (R;US)
Robertson, D.E., *See* Abel, K.H., 8:54000
Robie, D.M., Computerized micrographics in processing hard-copy records for an epidemiologic study, 8:55022 (RA;US)
Robinet, M.J., *See* Wynveen, R.A., 8:53627
Robinson, A.H., *See* Nelson, J.B., 8:53913
Robinson, N.J., *See* Butcher, A.G., 8:54799
Roblee, J.W., Precision support of annular optics, 8:54479 (R;US)
Rodacy, P.J., *See* Leisher, W.B., 8:54413
Rodin, A.M., *See* Ter-Akopyan, G.M., 8:54761
Rodliffe, R.S., *See* Gwyther, J.R., 8:53712
Rodrigues, S., Decommissioning engineering within the framework of the French nuclear structure, 8:53635 (RA;US)
Roedel, R., *See* Wieser, K.E., 8:54452
Roesijadi, G., *See* Hardy, J.T., 8:54949
Rogers, L.B., *See* Hsu, T.B., 8:54336
Rogers, P.S.Z., *See* Benjamin, T.M., 8:55094
Rogers, S.C., Tunable damper for an acoustic wave guide, 8:54543 (P;US)
Rohay, A.C., *See* Bergstrom, K.A., 8:53680
Rohrer, S., *See* Gravitis, I., 8:54871
Rollins, J., Properties of nodular ductile graphite cast iron used in GNS-manufactured spent fuel casks, 8:54381 (RA;US)
Romesberg, L.E., TRansuranic PACkage Transporter (TRUPACT) system design status and operational support equipment, 8:54400 (RA;US)
See Cashwell, J.W., 8:53556
See Moore, R.L., 8:54421
Romney, E.M., *See* Hunter, R.B., 8:54914
Ronchetti, C., *See* Agostinelli, A., 8:53999
Rondeau, D.J., *See* Hearn, W.E., 8:54773
Ronen, Y., *See* Cacuci, D.G., 8:53924
Ronkowski, F.G., *See* Amimoto, S.T., 8:54505
Ronzhin, A.I., *See* Datsko, V.S., 8:54681
Ropchan, J.R., *See* Barrio, J.R., 8:54348
Roscoe, R.J., Mortality followup through 1977 of the white underground uranium miners cohort examined by the US Public Health Service, 8:53692 (RA;US)
See Waxweiler, R.J., 8:55031
Rose, J.H., Elastic-wave inverse scattering in non-destructive evaluation, 8:54531 (R;US)
Inverse Born Approximation: exact determination of shape of convex voids, 8:54532 (R;US)
Progress on ultrasonic flaw sizing in turbine-engine rotor components: bore and web geometries, 8:54534 (R;US)
See Hsu, D.K., 8:54533
See Thompson, D.O., 8:54536
Rosen, L.C., Evacuation emergency response model coupling atmospheric release advisory capability output, 8:54037 (R;US)
Rosen, M.D., Creation of ultra-high-pressure shocks by the collision of laser-accelerated disks: experiment and theory, 8:55315 (R;US)
Rosenberg, J.T., *See* Cowperthwaite, M., 8:54867
Rosenthal, S.E., *See* Mendel, C.W. Jr., 8:55297
Ross, K.E.L., *See* Welles, B.W., 8:53537
Rothe, D.E., *See* Young, R.T., 8:53764, 8:54283
Rotman, F., *See* Igata, N., 8:54232
Routti, J.T., *See* Lund, P.D., 8:53809
Roux, Pierre, Minimal features of a computer and its basic software to execute NEPTUNIX 2 numerical step, 8:55329 (R;FR;In French)
Rowe, M.D., Health impacts of productive conservation in urban transportation. Tapcut technical memorandum No. 27, 8:54149 (R;US)
See Moskowitz, P.D., 8:53788
Rowe, P.G., Energy and other resource conservation within urbanizing areas, 8:54176 (J;US)
Roy, J.C., Heat transfers: calculation of temperatures using a HP 41 CV microcomputer, 8:54518 (RA;US)
Royal, T., *See* Shaw, R.W., 8:54901, 8:54902
Rubin, S.G., *See* Ramakrishna, K., 8:54520
Rudenko, A.I., *See* Bystritskij, V.M., 8:54696
Ruedo, F., *See* Pezuela, P., 8:53780
Ruether, J.A., *See* Joshi, J.B., 8:53415
Ruscic, L., *See* Dyrkacz, G.R., 8:53374
Rusnak, J.J., *See* Pardini, J.A., 8:53905
Russ, A., *See* Chauvat, P., 8:54713
Russell, F.M., Energy storage for wind-generator application, 8:53849 (R;US)
Russell, J.A., *See* Som, P., 8:54969
Russell, L.W., *See* Howland, J.W., 8:53395, 8:53396
Russell, P.S., *See* Ballard, T.D., 8:53894
Russell, R.W., *See* Giguere, R.P., 8:54784
Ryan, T., *See* Cox, B., 8:54716, 8:54719
Ryder, D.E., Management of QA in an R and D organization, 8:55327 (R;US)
Rykalin, V.I., *See* Datsko, V.S., 8:54681
Rymer, A.C., Things that can go wrong when time is of the essence, 8:53710 (RA;US)
See Blalock, L.G., 8:53575
Rytuba, J.J., Relation of mercury, uranium, and lithium deposits to the McDermitt caldera complex, Nevada-Oregon, 8:53466 (R;US)
Ryu, C.M., Spectrum of resistive MHD modes in cylindrical plasmas, 8:55245 (R;US)

S

Saad, E.A., *See* El Wakil, S.A., 8:55204
Sabo, N.A., *See* Yano, H., 8:55341
Sackett, K.E., Experimental data report for Semiscale Mod-2B Power-Loss Test Series (Tests S-PL-1, -2, and -3), 8:54034 (R;US)
Saddlier, J., *See* Fry, J., 8:54659
Saegusa, T., Proposal of guidelines for selecting optimum options in packaging and transportation systems of spent fuel, 8:53545 (RA;US)
Saffouri, M.H., Treatment of Cerenkov radiation from electric and magnetic charges in dispersive and dissipative media, 8:55203 (R;XA)
Safronova, U.I., *See* Bitter, M., 8:55246
Saglam, A., Cerenkov radiation. Master's thesis, 8:55201 (R;US)
Sajdak, R.L., Application of sugar maple and black locust to the biomass/energy-plantation concept. Annual report, March 1, 1981-February 28, 1982, 8:53772 (R;US)
Saji, G., *See* Miyazawa, T., 8:53977
Sakai, E., Summary of in-pile loop experiments related to the development of the fuel failure

detection systems for LMFBR in Japan, 8:53901 (R;JP)
Sakai, I., *See* Irie, Y., 8:54588
Sakai, K., Manufacture of superhigh vacuum testing tank, 8:54546 (RA;JP;In Japanese)
Sakai, T., Storage facility for casks awaiting shipment, 8:53506 (RA;US)
Sakaji, R.H., *See* Daughton, C.G., 8:54486
Sakamoto, M., Test and analysis on impact characteristics evaluation of nuclear fuel packaging loaded on vehicle, 8:54393 (RA;US)
Sakurada, Y., Ion source of the accelerator for heavy ion fusion, 8:54607 (RA;JP)
Salamatin, I.M., *See* Vagov, V.A., 8:53940
Salatskij, V.I., *See* Gledenov, Yu.M., 8:55178
Sallach, R.A., NaOH-rich corner of the (Na^+, Ca^{2+}) (OH^-, CO_3^{2-}) reciprocal system, 8:54031 (R;US)
Salour, M.M., Non-linear optical interactions in semiconductors. Final report 1 Apr 79-31 Mar 83, 8:54507 (R;US)
Salzbrenner, R., *See* VanDenAvyle, J.A., 8:54384
Salzman, G.C., Optically active biological particle-distinguishing apparatus, 8:54918 (P;US)
Samaraweera, M.K.S.A., Use of isotopes for the study of Hevea and other tree crops, 8:54987 (RA;XA)
See Ladonin, V., 8:54992
Samet, J.M., Studies of Grants, New Mexico, uranium miners: status as of December, 1982, 8:55033 (RA;US)
Samirant, M., Deflagration detonation transition in waxes RDX, 8:54798 (RA;US)
Sammel, E.A., Geothermal hydrology of Warner Valley, Oregon: a reconnaissance study, 8:53829 (R;US)
Samosvat, G.S., *See* Nikolenko, V.G., 8:55187
San Pedro, M., Argentine developments for a Type B cask, 8:54404 (RA;US)
Sancier, K.M., Effects of catalysts and CO_2 gasification on the ESR of carbon black. II, 8:53357 (J;US)
Sander, H.G., *See* Althoff, M., 8:55136
Sanders, J.P., Core support performance test in the component flow test loop, 8:53906 (BA;GB)
Sandorfi, A.M., *See* Thorn, C.E., 8:54631
Sandoval, A., *See* Renfordt, R.E., 8:55194
Sandoval, R.P., Assessment of the safety of spent fuel transportation in urban environs, 8:53553 (RA;US)
See Burian, R.J., 8:53705
Sands, T.D., *See* Dolan, J.E., 8:53825
Sandukovskij, V.G., Position-sensitive semiconductor detectors of nuclear radiations, 8:54695 (R;SU;In Russian)
Sandusky, H.W., Compaction of porous beds of inert materials, 8:54851 (RA;US)
See Bernecker, R.R., 8:54797
Sandusky, W.F., Candidate wind-turbine generator site cumulative meteorological data summary and data for January 1982 through September 1982, 8:53851 (R;US)
Sano, K., *See* Araki, H., 8:53946
Santarova, M., *See* Vojtech, O., 8:53682
Sapienza, R.S., Physico-chemical fracturing and cleaning of coal, 8:53412 (R;US)
Sarangi, S., *See* Barclay, J.A., 8:54475
Sarantites, D.G., *See* Jaeaeskelaeinen, M., 8:55192
Sarantsev, V.P., Experimental determination of the nuclear reaction yield uses for beam diagnostics of the KUTI prototype, 8:54583 (R;SU;In Russian)
Sargent, S.A., Technical and economic feasibility of utilizing apple pomace as a boiler feedstock, 8:53746 (R;US)
Sasaki, H., *See* Irie, Y., 8:54588
Sasanuma, T., *See* Konno, O., 8:54614
Sastry, S., Coherency for interconnected power systems, 8:53866 (J;US)
Satoh, K., *See* Miyaguchi, K., 8:53973
Satterfield, C.N., *See* Nuff, G.A., 8:54316
Satya Murthy, N.S., Research within the coordinated programme on neutron scattering techniques in applied research. Final report for the period 1 October 1978 - 31 December 1981, 8:55202 (R;XA)
Savage, R.T., *See* Todd, L.L., 8:54148
Savitz, D.A., Critical review of the Hanford worker studies: cancer risk and low-level radiation, 8:55037 (RA;US)
Savlevich, L., *See* Kulinski, S., 8:54580
Savos'kina, G.V., Adaptation of the NF-6 complex programs to the ARAMAKO constants, 8:53896 (R;SU;In Russian)
Savvateev, A.S., *See* Vagov, V.A., 8:53940
Sawyer, S.G., Testing procedure for the certification of underground protective cabs and canopies, 8:53426 (R;US)
Scanlan, R.M., *See* Hoard, R.W., 8:55310
Scarpa, G., *See* De Marco, I., 8:53490
Schaal, H., *See* Neef, R.D., 8:53883
Schaefer, F. III, *See* Vincent, M.A., 8:54325
Schaller, K.H., Decontamination research in the Commission of European Communities' programme on decommissioning of nuclear power plants, 8:54014 (RA;US)
Scharer, J.S., *See* Vernon, R.J., 8:55264
Scharf, W., *See* Crevier, W.F., 8:54754
See van Lint, V.A.J., 8:54756
Schauf, F., *See* Neely, N., 8:54942
Schenk, H., PWR nuclear power stations in the German Federal Republic: operating experience with pressurized-water plants, 8:53877 (TJ;GB)
Schermerhorn, J.R., *See* Yarborough, R.D., 8:53526
Schertz, W.W., *See* Allen, J.W., 8:53815
Scheuter, F., Use of a transport equation for the dynamical behaviour of the nuclear fission, 8:55197 (R;FR)
Schier, A., *See* Vincent, M.A., 8:54325
Schierholz, G., *See* Barbour, I.M., 8:55146
Schilling, H., *See* Rittscher, D., 8:53637
Schilperoord, A.A., Low-velocity detonation of nitromethane, 8:54828 (RA;US)
Schlafke, A.P., Combined cold compressor/ejector helium-refrigerator cycle, 8:54376 (R;US)
See Wu, K.C., 8:54375
Schlein, P.E., *See* Chauvat, P., 8:54713
Schmerr, L.W., *See* Thompson, R.B., 8:54537
Schmid, J., Mesh generation for fast reactor fuel assembly in velocity and temperature field calculations using finite element method, 8:53922 (R;CS;In Czech)
Schmidbaur, H., *See* Vincent, M.A., 8:54325
Schmidt, I., *See* Bahr, J., 8:54702
Schmidt-Boecking, H., *See* Schuch, R., 8:55105
Schmitz, D., *See* Althoff, M., 8:55136
Schneider, H., *See* Barbour, I.M., 8:55146
Schneider, K.A., Risk analysis of transporting vitrified high level radioactive waste by train, 8:53696 (RA;US)
See Christ, B., 8:53935
Schneider, M.J., Mutants of thermotaxis in Dictyostelium discoideum, 8:55067 (J;US)
Schneringer, P.E., Economic evaluation of nuclear waste transportation casks, 8:54445 (RA;US)
Schoenbacher, H., *See* Beynel, P., 8:54272
Schoenfeld, R., Dry storage concepts and their thermodynamic layout, 8:53591 (BA;XN)
Schoenleber, R.W., Chromopeptides from phycoerythrins. Structure and linkage of a phycoerythrobilin tryptic tripeptide derived from a B-phycoerythrin, 8:54328 (J;US)
Schofield, P.E., Study of the behavior of actinides continuously recycled in a hard spectrum reactor, 8:53912 (R;US)
See Nelson, J.B., 8:53913
Scholl, K.H., Research at full-scale: the HDR programme, 8:54039 (J;GB)
Schomaker, N.B., Hazardous waste landfill research, 8:54910 (R;US)
Schreckhise, R.G., *See* Garland, T.R., 8:54928
Schreiber, G.J., *See* Weiner, R.E., 8:54347
Schrire, D.I., Swelling and gas release of grain-boundary pores in uranium dioxide, 8:54255 (R;US)
Schroeder, L., *See* Burgy, D., 8:53944, 8:53945
Schuch, R., Interference effects in the quasimolecularen K-radiation induced in collisions of hydrogen-like ions, 8:55105 (R;DE;In German)
Schuck, L.J., *See* Ackerman, A.D., 8:54143
Schueler, R., How to sit most comfortably between two chairs or how to implement physical protection measures for transport, 8:53715 (RA;US)
Schueller, P.G., *See* Thumm, M., 8:55276
Schuit, G.C.A., *See* Gates, B.C., 8:53366
Schuler, R.E., Spatial price duopoly under uniform delivered pricing, 8:54106 (J;GB)
Schulman, J.N., On the theory of the KVV Auger spectrum of Li, 8:55120 (J;US)
Schultheisz, R.J., *See* Hummel, D.J., 8:55330
Schultz, A.J., Argonne intense pulsed neutron source used to solve the molecular structure of a novel organometallic complex, 8:54318 (J;US)
Schultz, K.R., *See* Hopkins, G.R., 8:55291

Schulz, R.J., Numerical investigation of recirculation in the UTSI MHD combustor, 8:54113 (R;US)
Schulz-Forberg, B., Transport and storage of RAM: the role of BAM, 8:53510 (RA;US)
Transport of RAM in tanks: how to fit into the IAEA safety philosophy, 8:53481 (RA;US)
Schumann, S., *See* Freund, H.U., 8:53998
Schumm, S.A., *See* Nelson, J.D., 8:53655
Schuricht, V., *See* Doerschel, B., 8:54742
See Gruellich, A., 8:55214
Schwartz, M.W., Design criteria for nodular cast iron shipping containers, 8:54383 (RA;US)
Protecting against failure by brittle fracture in ferritic steel shipping containers, 8:54378 (RA;US)
Schwartz, R.B., Experimental verification of the neutron spectrum from the NBS D_2O-moderated ^{252}Cf source, 8:55212 (R;US)
Schwarz, G., Imprecision in estimates of dose from ingested ^{137}Cs due to variability in human biological characteristics, 8:55062 (J;GB)
Schweer, H.H., Criticality aspects of the transport of fissile materials, 8:53561 (RA;US)
Schweitzer, D.J., *See* Reif, J.S., 8:55034
Schwieren, G., *See* Behrendt, V., 8:53716
Scofield, R., *See* Hamid, A., 8:54153
Scott, C.D., *See* Strandberg, G.W., 8:53741
Scott, L.A., *See* Gureghian, A.B., 8:53673
Scott, R.G., *See* Winans, R.E., 8:53378
Scudder, R.J., *See* McCord, T.B., 8:53817
Sealock, L.J. Jr., *See* Lyke, S.E., 8:54115
Seals, E.D., Analysis of accidents related to falls of ground in metal and nonmetal mines, 1972-73, 8:55074 (R;US)
Searcy, A.W., Equilibrium shapes of crystals and of cavities in crystals, 8:54311 (J;US)
Searles, R., *See* Gray, R.J., 8:53364
Sebok, D., *See* DeCarlo, R., 8:53855
Sebrell, W., Potential for containment leak paths through electrical penetration assemblies under severe accident conditions, 8:54030 (R;US)
Segado, R., *See* Menossi, C., 8:53491
Segall, S.B., Review of two-stage FEL research at KMS fusion. Technical report Jan-Sep 82, 8:54500 (R;US)
Seidel, D.B., *See* Dreike, P.L., 8:55299
Seitz, M.G., *See* Pecina, R.J., 8:53431
Seki, A., *See* Murakami, H., 8:54734
Seki, A.S., Solar-photovoltaic energy system for the G.N. Wilcox Memorial Hospital and Health Care Center, 8:53789 (RA;US)
Sekiguchi, A., *See* Maki, Y., 8:54459
Sekiguchi, N., Current status of Japanese research and development activity and program plan on failed fuel detection and location systems for LMFBR, 8:53900 (R;JP)
Gas tagging system development in Japan, 8:53902 (R;JP)
See Sakai, E., 8:53901
Selan, J.C., Technical-evaluation report on the monitoring of electric power to the reactor-protection system for the Peach Bottom Atomic Power Station Units 2 and 3 (Docket Nos. 50-277, 50-278, 8:53909 (R;US)
Seliger, H.H., Chemiluminescence of benzo[a]pyrene-7,8-diol, 8:54342 (J;GB)
Selove, W., Calorimetry at $L = 10^{33}$, 8:54720 (RA;US)
Scintillator calorimetry with vacuum photodiode readout, 8:54718 (RA;US)
Semenciw, R., *See* Letourneau, E.G., 8:55035
Sen, M., *See* Trevino, C., 8:54363
Sen'ko, V.A., *See* Bushnin, Yu.B., 8:54679
Sendlein, L.V.A., Surface mining environmental monitoring and reclamation handbook, 8:53400 (R;US)
Senesh, D., *See* Vorob'ev, E.D., 8:54217
Sentman, L.H., Development of a single species equation of state for detonation products suitable for hydrocode calculations, 8:54840 (RA;US)
Serafin, N., *See* Benninghofen, G., 8:53886
Sergeev, F.M., *See* Gornov, M.G., 8:55188
Serne, R.J., *See* Peterson, S.R., 8:54926
Serpekian, T., *See* Benninghofen, G., 8:53886
Sert, G., Family of casks for transport of LWR spent fuel, 8:54417 (RA;US)
Servas, J.M., *See* Chaisse, F., 8:54836
Sesnic, S., *See* Bitter, M., 8:55246
Sessler, A.M., *See* Paul, A.C., 8:54594
Setlow, R.B., Estimating the carcinogenetic effects on humans of low doses of radiation or chemicals, 8:55066 (J;US)
Setork, A., *See* Eddingfield, D.L., 8:54487
Sevelinge, G., Solar collector, 8:53820 (P;FR;In French)
Sexton, K., Ambient hydrocarbon and ozone concentrations near a refinery. Final report, 8:54885 (R;US)
Seyfried, W.E. Jr., *See* Thornton, E.C., 8:53683
Shabalin, E.P., *See* Vagov, V.A., 8:53940
Shah, H.K., *See* Murphy, J.R., 8:54869
Shah, Y.T., *See* Albal, R.S., 8:53414
See Joshi, J.B., 8:53415, 8:53416, 8:53417
Sham, T.K., X-ray absorption spectra of ruthenium L edges in $Ru(NH_3)_6Cl_3$, 8:54317 (J;US)
See Lazarus, M.S., 8:54260
Shamsuarov, A.D., *See* Gavrilin, V.A., 8:53936
Shanks, H.R., Amorphous silicon-carbon films, 8:54274 (R;US)
Phonon density of states of amorphous silicon, 8:54277 (R;US)
Shannon, J.D., Estimation of wet and dry deposition of pollutant sulfur in eastern Canada as a function of major source regions, 8:54893 (J;NL)
See Wesely, M.L., 8:54879
Shapiro, A.B., FACET: a radiation view factor computer code for axisymmetric, 2D planar, and 3D geometries with shadowing, 8:54525 (R;US)
Shappert, L.B., Drop test facility available to private industry, 8:54402 (RA;US)
Sharapov, Eh.I., *See* Alfimenkov, V.P., 8:55180
Sharma, R.R., *See* Sundaram, S., 8:54271
Sharp, R.R. Jr., *See* Mann, A.K., 8:54656
Shaw, K.B., Radiation exposure resulting from the transport of radioactive materials within the United Kingdom, 8:53701 (RA;US)
See Holyoak, B., 8:53511
Shaw, R.W., Ohio River Valley Study. Sites, methods, data summary for 1980. Volume 1. Main report. Report, October 1979-December 1980, 8:54901 (R;US)
Ohio River Valley Study. Sites, methods, data summary for 1980. Volume 2. Appendices. Report for Oct 79-Dec 80, 8:54902 (R;US)
Shayer, Z., *See* Cacuci, D.G., 8:53924
Sheeley, N.R. Jr, Quantitative study of magnetic flux transport on the sun, 8:55088 (R;US)
Sheffield, J., Review of the beta situation, 8:55236 (R;US)
Sheffield, R.L., *See* Warren, R.W., 8:54511
Sheffield, S.A., *See* Bloomquist, D.D., 8:54862
Shelaev, I.A., Three prototype units of a superconducting magnet system, 8:54613 (R;SU;In Russian)
Shelkov, G.A., *See* Krumshtejn, Z.V., 8:54697
Shelton, R.N., Coexistence of long-range magnetic order and superconductivity: an overview of ternary rare-earth compounds, 8:54273 (R;US)
Shen, S.S., *See* Kim, S.H., 8:54471
Shen, S.Y., Sonic resonator control and method for determining component concentration in multiple-component liquid, 8:54772 (P;US)
Shenoy, G.K., Magnetism and crystal fields in ternary superconductors, 8:54288 (BA;US)
Shepanek, R., *See* Gravitis, I., 8:54871
Shepherd, E.W., Enhancing public acceptance through improving and enlarging public understanding, 8:53500 (RA;US)
Perceptions of risk in transporting radioactive material, 8:53534 (RA;US)
See Cashwell, J.W., 8:53556
Sherin, V.A., Mathematical model for long-term and current planning of materials research and development with restrictions on the experimental equipment lifetime, 8:54542 (R;SU;In Russian)
Sherman, G. Jr., Experience in spent nuclear reactor fuel cells, 8:53872 (RA;US)
Sherstyanov, D.I., *See* Zabolotin, V.P., 8:54584
Sherwood, P., *See* Chauvat, P., 8:54713
Shevelev, Ya.V., Forms of self-supporting relations in the electric power engineering in the presence of nuclear power plants, 8:53911 (R;SU;In Russian)
Shibata, T., *See* Shiroya, S., 8:53964
Shieh, L.C., *See* Bohn, M.P., 8:54032
Shigemitsu, J., Studies of chiral symmetry breaking in lattice gauge theory, 8:55155 (R;US)
Shimade, H., Safety assessment and fire test on Type B packages of combustible thermal insulator for radioactive materials, 8:53485 (RA;US)
Shimamura, S., *See* Aoki, S., 8:53507
Shimazaki, J., Simulation study of neutronic and acoustic methods of boiling detection, 8:53948 (R;JP)
Shimoda, A., *See* Sakamoto, M., 8:54393

Shimotake, H., Positive-electrode current collector for liquid-metal cells, 8:54051 (P;US)
Shin, K., Simultaneous spectral measurement of fast neutrons and rays with an organic scintillator, 8:54753 (TJ;US)
Shinohara, Y., *See* Shimazaki, J., 8:53948
Shirai, T., *See* Nishino, S., 8:54541
Shirane, G., X-rays from synchrotron: A new challenge for neutron scattering, 8:55205 (J;NL)
See Iizumi, M., 8:54263
Shires, C.D., *See* Barrus, D.M., 8:54556
Shirley, C.G., Simple risk analysis tool for estimating release fractions from shipments of 55-gallon drums involved in transportation accidents, 8:53488 (RA;US)
Some design considerations for cask handling at large-scale shipping and receiving facilities, 8:54405 (RA;US)
Special requirements for shipping plutonium, 8:53514 (RA;US)
Transportation system preconceptual description for subseabed disposal of high-level waste, 8:53571 (RA;US)
See Moore, R.L., 8:54421
See Yount, J.A., 8:53713
Shiroya, S., Analysis of the KUCA MEU experiments using the ANL code system, 8:53964 (R;US)
See Murata, N., 8:53919
Shitikov, B.I., *See* Gavrilin, V.A., 8:53936
Shmal'ko, G.I., *See* Suvorov, M.M., 8:54622
Shochet, M., Triggers, 8:54710 (RA;US)
Shore, R.E., Thyroid cancer from occupational exposures to iodine-131, 8:55011 (RA;US)
See Harley, N.H., 8:55012
Short, J.M., Detonation. Proceedings, 8:54785 (R;US)
Simplified methods for predicting explosive performance parameters including Eremenko's relative detonation impulses, 8:54857 (RA;US)
Shorten, F.J., NBS reactor: summary of activities July 1981 through June 1982. Technical note. Jul 81-Jun 82, 8:53968 (R;US)
Shupe, J.W., Overview of renewable-energy development in Hawaii, 8:54107 (RA;US)
Shy, C., *See* Cookfair, D.L., 8:55029
Shy, C.M., *See* Checkoway, H., 8:55008
See Lushbaugh, C.C., 8:55009
Sieber, R., *See* Wieser, K.E., 8:54465
Sievers, R.H., *See* Daugherty, J.M., 8:54195
Silbernagel, B.G., Electron spin resonance of isolated coal macerals: a preliminary survey, 8:53376 (J;US)
Silnov, S.M., *See* Ter-Akopyan, G.M., 8:54761
Silver, A.H., Applications of Josephson junction SQUIDS (superconducting quantum interference device) and arrays. Annual progress report No. 1, 1 September 81-30 September 82, 8:54370 (R;US)
Demonstration of SQUID (superconducting quantum interference device) parametric amplifier. Annual report No. 1, 14 September 81-14 September 82, 8:54371 (R;US)
Simms, L.A., *See* Carlisle, C.T., 8:53432
Simonen, T.C., TMX-U experimental results, 8:55247 (R;US)
Simpson, H.J., Plutonium, cesium, uranium, and thorium series radionuclides in the Hudson River estuary and other environments. Annual technical progress report, December 1, 1982-November 30, 1983, 8:54952 (R;US)
Simpson, J., *See* Kramer, S.L., 8:54574
Simpson, W.F. Jr., Energygrams: brief descriptions of energy technology, 8:55343 (R;US)
Sinakhom, F., Preliminary investigation of radiation level and some radionuclides in imported food and food products, 8:54295 (R;TH)
Sinclair, R., *See* Smith, D.J., 8:54278
Sinclair, W.K., Utilization of epidemiological data in the development of radiation protection recommendations, 8:55017 (RA;US)
Sindorf, D.W., Solid-state NMR studies of the reactions of silica surfaces with polyfunctional chloromethylsilanes and ethoxymethylsilanes, 8:54324 (J;US)
Singley, P.T., *See* McLean, R.B., 8:53862
Siomos, K., *See* Christophorou, L.G., 8:55110
Sirisena, K., *See* Leenanupan, V., 8:54298
Sistla, G., Impact of New York state emission sources on Class 1 areas, 8:54894 (J;NL)
Site, A.D., *See* Clemente, G.F., 8:55041
Sitz, C.D., *See* Carlisle, C.T., 8:53432
Skalski, J.R., *See* Thomas, J.M., 8:53678
Skillings, B.J., *See* Rehbein, D.K., 8:54368
See Thompson, R.B., 8:54537
Skripkina, V.T., *See* Datsko, V.S., 8:54681
Skuratov, V.A., *See* Vorob'ev, E.D., 8:54217
Slagle, R.E., *See* Larson, G.F., 8:54303
Slate, M.P., Simulation of a passive solar energy system. Master's thesis, 8:53799 (R;US)
Slegeir, W.A., *See* Sapienza, R.S., 8:53412
Slesarev, I.S., *See* Kuz'minov, V.V., 8:53898
Slinn, W.G.N., Estimates for the long-range transport of air pollution, 8:54892 (J;NL)
Slutz, S.A., *See* Burns, E.J.T., 8:55300
See Dreike, P.L., 8:55299
See Sweeney, M.A., 8:55296
Smallman, R.E., *See* White, J., 8:54228
Smedskjaer, L., *See* Koegel, G., 8:54751
Smid, J., *See* Hejna, J., 8:53903
Smirnova, S.I., *See* Antipov, Yu.M., 8:54698
Smith, A.M., *See* Chauvat, P., 8:54713
Smith, D.F., *See* Joy, R.W., 8:54052
Smith, D.J., High voltage high resolution electron microscopy of compound semiconductors, 8:54278 (RA;US)
Smith, D.L., Decontamination and decommissioning of fuel reprocessing cells at the Idaho Chemical Processing Plant, 8:53619 (RA;US)
Smith, D.R., *See* Becker, K., 8:53572
Smith, G.W., *See* Zaccor, J.V., 8:55347
Smith, H.I., Zone-melting recrystallization for solar cells. Annual progress report, September 1, 1982-August 31, 1983, 8:53771 (R;US)
Smith, J.F., *See* Rehbein, D.K., 8:54368
Smith, K.M., *See* Fajer, J., 8:54339
Smith, L.J., *See* Gilbert, K.V., 8:53554
Smith, M.A., *See* Tothill, P., 8:55055
Smith, M.H., *See* Letourneau, E.G., 8:55035
Smith, M.R., *See* Bostwick, L.E., 8:53335
Smith, P.A., *See* Duggleby, J.C., 8:54896
See Edwards, J.G., 8:55295
Smith, R.A., Parameter survey for collisionless coupling in a laser simulation of hane (high altitude nuclear explosion). Memorandum report, 8:54870 (R;US)
Smith, R.I., *See* Moore, E.B., 8:54012
Smithwick, R.W. III, *See* Fuller, E.L. Jr., 8:53373
Smondyrev, M.A., *See* Koudinov, A.V., 8:55224
Smyrl, N.R., *See* Fuller, E.L. Jr., 8:53373
Snelgrove, J.L., RERTR program progress in qualifying reduced-enrichment fuels, 8:53962 (R;US)
Status of RERTR fuel demonstrations, 8:53956 (R;US)
See Deen, J.R., 8:53958
Snider, M.A., *See* Levenson, J.B., 8:53439
Snipes, J.A., Observations of soft x-ray fluctuations with an imaging array on TEXT, 8:55244 (R;US)
Snyder, W.H., *See* Lawson, R.E. Jr., 8:53860
Sobieralski, T.J., *See* Calabrese, G.S., 8:54313
Sokolov, V.L., *See* Kaspin, A.I., 8:53939
Sollid, J.E., *See* Warren, R.W., 8:54511
Solodilov, A.V., *See* Alejnikov, V.E., 8:54700
Solomon, A.A., Mechanisms of elevated-temperature rupture in single-phase ceramics. Progress report, February 1, 1983-January 31, 1984, 8:54254 (R;US)
Solomon, A.D., Some aspects of the computer simulation of conduction heat transfer and phase change processes, 8:54045 (BA;US)
See Wilson, D.G., 8:54248
Solomon, S.B., *See* Fry, J., 8:54659
See Leach, V.A., 8:53467
Solov'ev, A.S., *See* Akimenko, S.A., 8:54682
Solov'ev, M.I., *See* Anoshin, A.I., 8:55169
Soltys, M.N., *See* Milne, T.A., 8:53352, 8:53783
Som, P., Quantitative autoradiography with radiopharmaceuticals, Part 2: Applications in radiopharmaceutical research: concise communication, 8:54969 (J;US)
Soman, S.D., Background radioactivity in the monazite areas of Kerala, India, 8:54924 (R;DE)
Somarjai, G., *See* Delanny, F., 8:53358
Sombret, C., Glass and nuclear wastes, 8:53606 (R;FR;In French)
See Bonniaud, R., 8:53605
Somerville, L.P., *See* Berry, H.G., 8:55108
Someya, H., *See* Irie, Y., 8:54588
Sondericker, J.H., Automation of a cryogenic facility by commercial process-control computer, 8:54374 (R;US)
Helium-flow measurement using ultrasonic technique, 8:54633 (R;US)
See Wu, K.C., 8:54375
Soo, P., Review of DOE waste package program. Subtask 1.1. National waste package program, October 1982-March 1983. Vol. 4, 8:53652 (R;US)

Review of waste package verification tests. Semiannual report, October 1982-March 1983, 8:53653 (R;US)
Sorenson, K., *See* Fowler, N., 8:54053
Sorem, E.R., *See* Orcutt, J.A., 8:53618
Sousselier, Y., How safety procedures can follow the evolution in transport of RAM, 8:53479 (RA;US)
See Hamard, J., 8:53700
South, D.L., *See* Daemen, J.J.K., 8:53657
Sowder, C.L., *See* Beck, W.L., 8:55032
See Cookfair, D.L., 8:55029
Spackman, W., *See* Davis, A., 8:53399
Sparrow, F.T., Energy and materials flows in the iron and steel industry, 8:54159 (R;US)
Speirer, R.A., *See* Seals, E.D., 8:55074
Spencer, D.J., F^2 boundary layer measurement in a chemical laser slit nozzle flow. Technical report, 8:54492 (R;US)
See Durran, D.A., 8:54494
Sperling, J.L., *See* Hamasaki, S., 8:55317
Spiess, H., *See* Mays, C.W., 8:55015
Spillekothen, H.G., *See* Benninghofen, G., 8:53886
See Craemer, B., 8:53888
Spiller, G.T., *See* Burgess, M.H., 8:54416
See Fry, C.J., 8:53543
Spindle, A., Sensitivity of early mouse embryos to [^{3}H]thymidine, 8:55060 (J;US)
Spindler, B., Equations governing the liquid-film flow over a plane with heat flux and interfacial phase change, 8:54529 (TG;US)
Spink, H.E., Notes on the design of ships used in the international transport of irradiated nuclear fuel, 8:53558 (RA;US)
Spinrad, B.I., *See* Nelson, J.B., 8:53913
Spiro, C.L., *See* Maylotte, D.H., 8:53367
Sprangle, P., Drag instability in the modified betatron. Memorandum report, 8:54571 (R;US)
Spreyer, F.C., Strategic Petroleum Reserve and Hawaii, 8:54091 (RA;US)
Squires, T.G., *See* Venier, C.G., 8:53344
St. John, G.E., Electric energy as a competitive business, 8:54094 (RA;US)
Staake, T., *See* Mangusi, J., 8:53566
Stachowiak, R.V., Nuclear criticality safety analysis of the Oak Ridge Y-12 plant birdcage-type containers for intraplant storage and transportation, 8:53548 (RA;US)
Stafford, R.W., *See* Finch, T., 8:53850
Stahl, D., Long-term performance of materials used for high-level waste packaging. Quarterly report, April-June 1983, 8:53656 (R;US)
Stahl, R.L., Use of aircraft imagery in evaluating ground stability at open-pit uranium mines in Gas Hills, Wyoming, 8:53468 (R;US)
Staiger, M.D., Valve for controlling solids flow, 8:53932 (P;US)
Stamper, J.A., Prospects for optical probing of the Rayleigh-Taylor instability in ablatively-accelerated foil targets. Progress report, 8:55256 (R;US)
Stanbro, W.D., Coal combustion waste leachate scaling. Final report, July 1981-June 1982, 8:53388 (R;US)
Stanek, M., *See* Howell, R.H., 8:54630
Stanev, T., *See* Gaisser, T.K., 8:54654
Stanfield, K.C., FNAL plans for upgrading the fixed target experimental area to 1 TeV, 8:54602 (RA;XC)
Stang, G., *See* Watzel, G.V.P., 8:54016
Stang, W., *See* Bergemann, L., 8:54001
Staniunas, J.W., On-site fuel cell field test support program. Annual report Jul 81-Jun 82, 8:54121 (R;US)
Stansbury, P.S., *See* Strom, D.J., 8:55020
Stansfield, O.M., *See* Homan, F.J., 8:53892
Stanton, P.L., Characterization of the DDT explosive, CP, 8:54852 (RA;US)
Stara, J.F., *See* Erdreich, L.S., 8:55071
Starke, E.A., *See* Kenik, E.A., 8:54233
Starkenberg, J., Ignition of solid high explosive by the rapid compression of an adjacent gas layer, 8:54786 (RA;US)
Starr, D.W., *See* Bostwick, L.E., 8:53335
States, J.B., Assessment of cold-climate environmental research priorities, 8:54062 (R;US)
Statham, J.R., *See* Cooper, M.B., 8:54921
Staub, W.P., *See* Nelson, J.D., 8:53654, 8:53655
Stebbings, J.H., Age and dose as determinants of times of appearance of radium-induced osteosarcomas in humans, 8:55026 (RA;US)
Stechel, E.B., *See* Heller, E.J., 8:55229
Steele, C.T., Heavy oil and oil sands research and development in Alberta, Canada, 8:53458 (RA;US)
Steeves, A.F., Micrographic detection of plastic deformation in nickel-base alloys, 8:54544 (P;US)
Stein, W.E., *See* Warren, R.W., 8:54511, 8:54513
Steinberg, R.I., *See* Cherry, M.L., 8:54647, 8:54653
Steinebach, E.F.M., New method to repair uranium hexafluoride cylinders, 8:54394 (RA;US)
Steiner, M., *See* Jauch, W., 8:53983
Steinmetz, G.R., *See* Morrison, E.D., 8:54329
Steinmueller, B., Energy balance of buildings, 8:54140 (R;DE;In German)
Stelman, D., *See* Dunks, G.B., 8:54337
Stensaas, J.P., Modeling of hydrocarbon fires. Subreport No. 1, 8:53739 (R;US)
Stepanenko, V.A., Assembly and copying of the results of multiview events from the RISK chamber measured on AELT-2/160 device, 8:54703 (R;SU;In Russian)
Stepantsov, S.V., *See* Ter-Akopyan, G.M., 8:54761
Stephens, H.P., Hydrous metal oxide ion exchangers as hydrogenation catalysts for direct coal liquefaction, 8:53360 (J;US)
Stephens, M.E., *See* Whitesides, G.E., 8:54462
Stephenson, K.Q., *See* McLaughlin, S.L., 8:54198
Stevens, C.G., Photolysis of water vapor on titanium/TiO_2 surfaces, 8:54341 (J;NL)
Stevens, H.C., *See* Hillis, D.L., 8:53794
Stewart, C.R., Neutral beam data systems at ORNL, 8:55285 (R;US)
Stewart, W.F., *See* Barclay, J.A., 8:54475
Steyer, H., Design calculations for a gas pipeline for the transport of solar-produced hydrogen over large distances taking non-stationary operating conditions into account, 8:53737 (TG;US)
Stiles, A.B., *See* Gates, B.C., 8:53366
Stillman, D.W., *See* Roblee, J.W., 8:54479
Stinson, A.J., *See* Moore, K.J., 8:54340
Stinton, L.H., Shallow land burial handbook, 8:53642 (R;US)
See Lee, D.W., 8:53674
Stitt, D.H., Testing of the Model 48-14 overpack for UF_6 cylinders, 8:54406 (RA;US)
Stitt, S.C., Automatic generation controller for Flatiron Dispatch Center-Laramie River Power station remote terminal unit, 8:53753 (R;US)
Stock, L.M., *See* Choi, C., 8:53379
Stock, R., *See* Renfordt, R.E., 8:55194
Stockwell, F.D., Cogeneration project - Clark University. Integrated Community Energy System, 8:54186 (R;US)
Stockwell, W.R., *See* Calvert, J.G., 8:54887
Stohl, F.V., *See* Stephens, H.P., 8:53360
Stolovy, A., Electron beam initiation of high explosives, 8:54791 (RA;US)
Stolzenburg, M.R., *See* Stolzenburg, T.R., 8:54891
Stolzenburg, T.R., Source reconciliation of atmospheric aerosols, 8:54891 (J;NL)
Stone, W.E., *See* Wilbur, D.S., 8:54333
Storch, P., *See* Hamid, A., 8:54153
Stormont, J.C., *See* Daemen, J.J.K., 8:53657
Strachan, D.M., *See* Babad, H., 8:53688
Strandberg, G.W., Ethanol production by Zymomonas mobilis, 8:53741 (R;US)
Strasma, J.D., Costs of decommissioning nuclear power plants as reported to the public to date, 8:54015 (RA;US)
Strauss, H.R., Finite-aspect-ratio MHD equations for tokamaks, 8:55319 (J;AT)
Strehlow, R.A., *See* Sentman, L.H., 8:54840
Streit, R.L., *See* Bohn, M.P., 8:54032
Streubel, G., Determination of the secondary radiation field of the Dubna synchrocyclotron, 8:54623 (R;DD;In German)
Device for evaluating solid-state track detectors by means of light transmission measurements, 8:54737 (R;DD;In German)
See Gruellich, A., 8:55214
Strickland, J.H., *See* Oler, J.W., 8:53852
Striker, R.P., *See* Hardee, H.C., 8:54782
Stroebele, H., *See* Renfordt, R.E., 8:55194
Stroemich, A., *See* Neef, R.D., 8:53883
Strom, D.J., Standard procedures for pooling health physics data for epidemiologic studies, 8:55020 (RA;US)
Strugalski, Z., Neutral pion production in pion-xenon nucleus collisions at 3.5 GeV/c momentum, 8:55185 (R;SU)
Study of the incident pion deflection in passing through atomic nucleus, 8:55184 (R;SU)
Study of the particle production process using nuclear targets. Pt. 3 Effects testable in hadron-nucleon experiments, nature of intermediate objects, conclusion, 8:55149 (R;SU)
Stygar, W.A., *See* Burns, E.J.T., 8:55300
Suddeth, D., *See* Kramer, S.L., 8:54574
Suessmilch, J., *See* Vojtech, O., 8:53682

Sugama, T., Magnesium-phosphate-glass cements with ceramic-type properties, 8:54284 (P;US)
Sugier, A., Dry storage of spent fuels. French experience, 8:53587 (BA;XN;In French)
Sugimoto, K., Nuclear physics experiment at INS, 8:55165 (R;JP)
Sugita, Y., Development of a toroidal shell-type shock absorber for an irradiated fuel shipping cask, 8:54466 (RA;US)
Sugonyaev, V.N., *See* Gladyshev, A.M., 8:54213
Suhr, N.H., *See* Davis, A., 8:53399
Sukhachev, V.A., *See* Basova, B.G., 8:53967
Suleimanov, M.K., *See* Anoshin, A.I., 8:55169
Summers, D.A., Potential advantages of a water jet reaming device, 8:53838 (BA;US)
Sundaram, S., Deep level defects in semiconductors. Final technical report 1 Jul 78-30 Jun 80, 8:54271 (R;US)
Sung, N.W., Effect of volatility on air-fuel ratio distribution and torque output of a carbureted light aircraft piston engine. Final report, May 1981-September 1982, 8:54197 (R;US)
Sutherland, A.A., *See* Bernhardt, D.E., 8:53632
Sutherland, J.V., Theoretical epidemiology applied to health physics: estimation of the risk of radiation-induced breast cancer, 8:55013 (RA;US)
Sutherland, S.H., Experimental and analytical program to evaluate packaging and target hardness as related to nuclear waste transportation systems, 8:54427 (RA;US)
SSITS cask: a capsule transportation system, 8:53540 (RA;US)
Three-dimensional finite element analysis of radioactive material packagings, 8:54449 (RA;US)
Sutton, G., *See* Reese, J. Jr., 8:53819
Sutton, P.M., *See* Li, A., 8:54158
Suvonov, I., *See* Grishin, V.G., 8:55174
Suvorov, M.M., To the choice of a konfiguration of electromagnet magnetic circuit elements, 8:54622 (R;SU;In Russian)
Suvorov, V.M., *See* Bystritskij, V.M., 8:54696
Suzui, K., *See* Sakai, K., 8:54546
Suzuki, F., Suppressive action of near-ultraviolet light on ouabain resistance induced by far-ultraviolet light in Chinese hamster cells, 8:55052 (J;NL)
Suzuki, K., *See* Kohyama, A., 8:54231
Swallowe, G.M., Effect of polymers on the drop-weight sensitiveness of explosives, 8:54788 (RA;US)
Swann, T.A., *See* Warren, R.W., 8:54511
Sweeney, J.L., Program for developing professional capabilities in energy-conservation policy analysis. Final report, September 1979-December 1980, 8:54054 (R;US)
Sweeney, M.A., Analysis of mechanisms for anode plasma formation in ion diodes, 8:55296 (R;US)
Swenson, C.A., Equations of state for the alkali metals, with generalizations to NaCl, 8:54276 (R;US)
Piston-displacement equations of state for sodium, potassium, and rubidium metals to 20 kbar from 300 K to 4 K, 8:54275 (R;US)
Swenson, J.B., *See* Rosen, L.C., 8:54037
Swink, W.D., *See* Walburg, C.H., 8:53755
Sy, O., Transient kinetic studies of char reactions in a gradientless reactor system: CO_2 gasification, 8:53355 (J;US)
Szanto, M., Shock response of flexible polyurethane foams, 8:54470 (RA;US)
Szpilewicz, A., Metallurgical coal in the 1980's - facts and prospects, 8:53423 (R;US)
Szybinski, Z., Development of the kits for RIA simultaneous determination of polypeptide hormones. Final report for the period 15 March 1980 - 14 December 1982, 8:54973 (R;XA)

T

Tabe, T., Status of dry storage of irradiated fuel in Canada, 8:53595 (BA;XN)
Tachibana, Y., *See* Fukushima, T., 8:54490
Takada, K., *See* Yokoyama, H., 8:54418
Takahashi, M., *See* Hosokawa, T., 8:54545
Takanaka, M., *See* Nakanishi, T., 8:54581
Takeda, H., *See* Segall, S.B., 8:54500
Takeuchi, Y., *See* Mutou, M., 8:54609
Takeyama, T., *See* Kohyama, A., 8:54231
Talaska, D., *See* Green, M.A., 8:54477
Tallant, D.R., *See* Leisher, W.B., 8:54410
Tam, K.K., *See* Fry, J., 8:54659
Tam, W., Bimetallic anionic formyl complexes: synthesis and properties, 8:54331 (J;US)
Tamakoshi, H., *See* Maki, Y., 8:54459
Tamamura, T., *See* Yokoyama, H., 8:54418
Tamhankar, S.S., Experimental studies on the control of hydrocarbons emission from a gasifier. Final report, September 1981-February 1983, 8:53337 (R;US)
Tamura, M., Integrated leak rate test results of JOYO reactor containment vessel, 8:53975 (R;JP)
Tamura, S., Operation experiences of JOYO fuel failure detection system, 8:53971 (R;JP)
Tamura, T., *See* Lee, S.Y., 8:55063
Tan, B.S., Planar flyer plate driven by detonation product convergent flow, 8:54849 (RA;US)
Tanabe, N., *See* Igata, N., 8:54232
Tanaka, K., *See* Presles, H.N., 8:54829
Tancredi, J., ECRH transmission system, 8:55278 (RA;US)
Tang, J.S., *See* Parks, C.V., 8:54461
Taniyama, H., *See* Inoue, T., 8:53974
See Kodaira, K., 8:53970
Tankersley, W.G., *See* Strom, D.J., 8:55020
Tansley, R.S., Research on upgrading structures for host and risk area shelters, phase II. Final report, 8:54373 (R;US)
Tantau, H.J., Closing-down greenhouses in times of high energy demand, 8:54166 (R;DE;In German)
Taralis, D., Thermal analysis for the design of a CANDU irradiated fuel transportation cask, 8:54436 (RA;US)
Tarini, E.J., *See* Ackerman, A.D., 8:54143
Tarnuzzer, E.C., *See* Clark, J.R., 8:53567
Tarrer, A.R., Improving the quality of deteriorated recycle solvents. Quarterly report, August 1982-November 1982, 8:53343 (R;US)
Solvent tailoring in coal liquefaction. Quarterly report, May 1982-August 1982, 8:53338 (R;US)
Solvent tailoring in coal liquefaction. Quarterly report, August 1982-November 1982, 8:53339 (R;US)
Solvent tailoring in coal liquefaction. Quarterly report, February 1982-May 1982, 8:53340 (R;US)
Solvent tailoring in coal liquefaction. Quarterly report, November 1982-February 1983, 8:53341 (R;US)
See Curtis, C.W., 8:53345
Tasker, D.G., Shock initiation and subsequent growth of reaction in explosives and propellants: the low amplitude shock initiation test, LASI, 8:54809 (RA;US)
Tassano, P.L., Deposition of cesium iodide on parylene, 8:54771 (R;US)
Tasuda, M., Experimental and numerical study of the thermal tests on the spent fuel shipping cask (50-ton-class cask) using a furnace, 8:54438 (RA;US)
Taylor, G.J., Accumulation of atmospherically deposited metals in wetland soils of Sudbury, Ontario, 8:54912 (J;NL)
Taylor, J., Computerized system for matching and stretching two-dimensional gel patterns represented by parameter lists, 8:54338 (BA;DE)
Taylor, J.C., Controls necessary to assure regulatory compliance on radioactive material shipments, 8:53519 (RA;US)
Taylor, J.D., *See* Green, M.A., 8:54477
Taylor, J.M., *See* Luna, R.E., 8:53498
See Madsen, M.M., 8:53486
Taynton, L.F., Implementation of HM-164: an historical perspective, 8:53551 (RA;US)
See Blalock, L.G., 8:53513
See Rymer, A.C., 8:53710
Teleshnikov, S.A., *See* Bechvarzh, F., 8:55186
Teller, R.G., *See* Schultz, A.J., 8:54318
Temkin, R., ECRH transmission system, 8:55279 (RA;US)
Temkin, R.J., 100 kW, 140 GHz pulsed gyrotron, 8:54555 (J;US)
Temus, C.J., Development of a transport cask for contaminated steam generators, 8:54419 (RA;US)
Tennant, R.W., *See* Liou, R.S., 8:55051
Tennery, V.J., *See* Finch, C.B., 8:54265
Tenney, F., *See* Bitter, M., 8:55246
Teper, B., Metal integrated container as part of an integrated system for back-end of irradiated fuel management, 8:53550 (RA;US)
Teper, M., *See* Barbour, I.M., 8:55146
Ter-Akopyan, G.M., "Lidia" ultrasensitive mass spectrometer, 8:54761 (R;SU)
Terada, S., *See* Ahrens, L.A., 8:55127
Terplak, M., *See* Rinsky, R.A., 8:55010
Tesche, C.D., Analysis of novel superconducting magnetometer with superior noise and coupling properties. Interim report, 8:54372 (R;US)

Testemale, G., Intervention device for use in a hostile environment, 8:54377 (RA;US)
Tetenbaum, M., *See* Porter, D.L., 8:55283
Thellier, F., *See* Chevalier, P., 8:53822
Theodosiou, G., *See* Selove, W., 8:54720
Theodosiou, G.E., Scintillators and waveshifters for fast scintillator-WSB calorimetry, 8:54717 (RA;US)
See Selove, W., 8:54718
Theodossiou, G.G., Efficient technique for calculating multiple solutions of electric-field problems. Part II. Corrections and modifications of the WINDOW program. Final report, 8:55222 (R;US)
Thieberger, P., Brookhaven Double MP Facility - recent developments and plans for the future, 8:54596 (R;US)
Thivet, R., Studies on transition from deflagration to detonation in high explosives at very small diameters, 8:54796 (RA;US)
Thomas, C.W., *See* Abel, K.H., 8:54000
Thomas, J.M., Survey of statistical and sampling needs for environmental monitoring of commercial low-level radioactive waste disposal facilities, 8:53678 (R;US)
Thomas, J.R. Jr., *See* Wideman, D.C., 8:53816
Thomas, L.E., *See* Yang, W.J.S., 8:53897
Thomas, M.G., *See* Bonk, G.J., 8:53761
Thomas, R.E., *See* Clifford, J.E., 8:54050
Thompson, A., *See* Seliger, H.H., 8:54342
Thompson, D.O., Elastic-wave scattering from multiple voids (porosity), 8:54536 (R;US)
See Hsu, D.K., 8:54533
See Rehbein, D.K., 8:54368
Thompson, M.L., General Electric Fuels Laboratory decontamination and decommissioning, 8:53617 (RA;US)
Thompson, R.B., Analytic diffraction corrections to ultrasonic scattering measurements, 8:54535 (R;US)
Effects of crack closure on ultrasonic transmission, 8:54537 (R;US)
See Rose, J.H., 8:54534
See Thompson, D.O., 8:54536
Thoms, R.L., Precise leveling, Vacherie salt dome, Webster and Bienville Parishes, Louisiana, 8:53667 (RA;US)
See Waldon, M.G., 8:53666
Thomson, J.D., *See* Goetsch, S.D., 8:54442
Thomson, J.E.M., *See* Webb, D.V., 8:54595
See Wilson, O.J., 8:54660
Thorn, C.E., Spectrometer coupled to an electron storage ring for tagging laser backscattered gamma rays, 8:54631 (R;US)
See Hansen, O., 8:55181
Thornton, E.C., Thermodiffusional transport in pelagic clay: implications for nuclear waste disposal in geological media, 8:53683 (J;US)
Thornton, E.W., *See* Gwyther, J.R., 8:53712
Thouvenin, J., Influence of the reaction zone on the state of detonation in a steady axial wave, 8:54834 (RA;US)
Thumm, M., Transmission lines and launching systems for ECRH on the garching stellarators W VIIa and W VII-AS, 8:55276 (RA;US)
Thun, M.J., *See* Waxweiler, R.J., 8:55031
Thurlbeck, A., Fuel temperature measurement in the WAGR, 8:53880 (R;XA)
Tibbitts, G.A., *See* DeLafosse, P.H., 8:53836
Tietjen, G.L., *See* Wilkinson, G.S., 8:55027
Tikhonov, L.Ya., *See* Kuznetsov, V.S., 8:53916
Timberlake, J., *See* Bitter, M., 8:55246
Timm, U.E., Meeting the challenge of the future in international transport operations: a transporter's point of view, 8:53520 (RA;US)
Timmerman, K.M., *See* Barker, C.R., 8:53410
Timokhin, L.A., *See* Bondarenko, V.V., 8:53928
Timoshenkoe, G.N., *See* Alejnikov, V.E., 8:54700
Tindall, K.R., Detection of deletion mutations at the gpt locus in pSV2gpt transformed CHO cells, 8:55039 (R;US)
Tisley, D.G., *See* Dyer, A.S., 8:54864
Titov, V.M., Investigation of transient processes at initiation of high explosives, 8:54816 (RA;US)
Tobin, R.L., Florida statewide coal-conversion study: coal-supply and transportation analysis, 8:53859 (R;US)
Todd, L.L., Fuel conservation evaluation of US Army helicopters. Part 5. Ah-1S flight testing. Final report, 31 July-21 September 1982, 8:54148 (R;US)
Todo, A.S., Monte Carlo calculations of initial energies of electrons in water irradiated by photons with energies up to 1 GeV, 8:55206 (J;GB)
Todo, S., *See* Iizumi, M., 8:54263
Tokuda, N., Beam loss in accumulation ring due to charge transfer and ionization processes, 8:54638 (RA;JP)
See Arai, S., 8:54564
Tolbert, N.E., *See* Cook, C.M., 8:54962
Tollestrup, A., *See* Kephart, R., 8:54725
Tolley, H.D., Note on homogeneity tests when combining 2 x 2 tables, 8:54982 (R;US)
See Carr, D.B., 8:55227
Tomb, T.F., *See* Treaftis, H.N., 8:55076
Tombini, C., *See* Boisard, F., 8:54863
Tominaga, G., *See* Okano, T., 8:54549
Tong, D.D., *See* Carlisle, C.T., 8:53432
Too, J.R., *See* Yutani, N., 8:54527
Torlin, B.Z., *See* Begichev, S.N., 8:53965
Torosyan, S.A., *See* Vasinyuk, I.E., 8:54678
Torrisi, S.P., Decontamination of the Frankford Arsenal, 8:53614 (RA;US)
Toshinskaya, Eh.F., *See* Bychkov, V.M., 8:55199
Tothill, P., Whole-body and part-body turnover of ^{85}Sr in Paget's disease, 8:55055 (J;GB)
Tow, D., *See* Grenier, R.M., 8:54446
Trahey, N.M., *See* McGonnagle, W.J., 8:54731
Trauger, D.B., Breeder reactor fuel reprocessing, 8:53473 (R;US)
Travelli, A., Current status of the RERTR Program, 8:53959 (R;US)
Current status of the US RERTR Program, 8:53963 (R;US)
Traverse, J.P., *See* Aries, L., 8:53824
Travis, B.J., *See* Brown, L.F., 8:54528
Travis, E., *See* Fry, J., 8:54659
Treaftis, H.N., Laboratory evaluation of RACAL airstream helmet, 8:55076 (R;US)
Treille, D., *See* Petronzio, R., 8:55132
Trent, D.S., Application of the TEMPEST computer code for simulating hydrogen distribution in model containment structures, 8:54035 (R;US)
Trester, P., *See* Hopkins, G.R., 8:55291
Trevino, C., Transient ignition in a flat plate boundary layer, 8:54363 (RA;US)
Trier, R.M., *See* Simpson, H.J., 8:54952
Triftshaeuser, W., *See* Koegel, G., 8:54751
Trifunac, A.D., Detection of transient paramagnetic intermediates by time-resolved magnetic resonance and related techniques, 8:54305 (J;GB)
Trimble, J.J., Flash x-ray cineradiography @ 100,000 FPS, 8:54861 (RA;US)
See Frey, R.B., 8:54806
Trka, Z., *See* Grishin, V.G., 8:55174
Trkova, Ya., *See* Grishin, V.G., 8:55174
Trofimov, V.S., *See* Dremin, A.N., 8:54846
Trujillo, A., *See* McConnell, P., 8:54379
Trujillo, A.A., Structural and thermal code evaluation, 8:54451 (RA;US)
See Clark, J.R., 8:53567
See Diggs, J.M., 8:54391
See Leisher, W.B., 8:54413, 8:54414
See Nelsen, J.M., 8:54440
See VanDenAvyle, J.A., 8:54384
Truskova, N.F., Sturm solutions of two-center problem in quantum mechanics, 8:55226 (R;SU;In Russian)
Tserruya, I., *See* Schuch, R., 8:55105
Tsuchiya, K., *See* Tamhankar, S.S., 8:53337
Tsujikawa, H., *See* Chida, K., 8:54642
Tsunakawa, H., *See* Igata, N., 8:54232
Tsupko-Sitnikov, V.M., *See* Byalko, A.A., 8:55115
See Churakov, A.K., 8:55336
Tully, A., Risk assessment for truck-transport assuming different concepts of the back-end of the fuel cycle, 8:53699 (RA;US)
Tummillo, A.F., *See* DeLuca, W.H., 8:54046
Tunaboylu, K., *See* Alder, J.C., 8:53629
Turner, J.E., *See* Todo, A.S., 8:55206
Turner, L.R., Consequences of shorted turns in a superconducting magnet, 8:54472 (R;US)
Turner, W.C., *See* Calderon, M.O., 8:55311
Turner, W.D., *See* Parks, C.V., 8:54461
Tuttle, P.G., *See* Aguilar, F., 8:53926
Tveten, U., Nordic study on reactor waste, 8:53697 (RA;US)
Tysoe, W.T., *See* Delanny, F., 8:53358
Tyutyunnikov, S.I., *See* Sarantsev, V.P., 8:54583

U

Uchino, M., *See* Sakamoto, M., 8:54393
Ueda, N., *See* Nakanishi, T., 8:54581
Ueki, K., *See* Maki, Y., 8:54459
Uematsu, Y., *See* Hosokawa, T., 8:54545
Ukai, K., Subsidiary FORTRAN subroutines at INS CAMAC system, 8:54608 (R;JP;In Japanese)

Ulbricht, W.H. Jr., Time-of-flight mass spectrometer, 8:54780 (P;US)
Ullmann, J.E., *See* Mauss, E.A., 8:54147
Ulrich, A., *See* Schulz-Forberg, B., 8:53481
Umbarger, C.J., TRU waste assay instrumentation and applications in nuclear facility decommissioning, 8:53625 (RA;US)
Uncapher, W.L., Packaging test capabilities of the SNL aerial cable facility, 8:54422 (RA;US)
See Diggs, J.M., 8:53544
See Yoshimura, H.R., 8:54443
Unger, H., *See* Kaspar, G., 8:53589
Upton, A.C., Historical background and overview of epidemiological studies on the effects of low-level radiation, 8:55014 (RA;US)
Urano, T., *See* Kanaji, T., 8:54548
Uranchi, J.N., Molokai Biomass Project, 8:53767 (RA;US)
Urban, K., *See* Banerjee, S., 8:54221
Urbanec, Z., Physical properties of uranium hexafluoride. Part A. Phase equilibria, 8:54346 (R;CS)
Ureda, B.F., *See* Kittinger, W.D., 8:53990
Uriarte, A., *See* Melches, C., 8:53584
Utochkin, B.A., *See* Gavrilin, V.A., 8:53936
Utsuro, M., *See* Okumura, K., 8:53732
Utz, B.R., *See* Narain, N.K., 8:53361
Uzunyan, A.V., *See* Maslov, M.A., 8:54606

V

Vadeev, V.P., *See* Beznogikh, Yu.D., 8:54611
Vader, D.T., *See* Anderson, D.W., 8:53370
Vagov, V.A., Multicomputer measurement centre of the Laboratory of nuclear physics - a prototype of computer network for automation of scientific research, 8:54693 (R;SU;In Russian)
System for correlational and spectral measurements of IBR-2 reactor parameters, 8:53940 (R;SU;In Russian)
Vainshtein, L.A., *See* Bitter, M., 8:55246
Vaisenberg, A.O., Masses, decay modes and lifetimes of charmed particles, 8:55143 (TG;DE)
Vakhromeev, B.A., *See* Bryukhanov, N.S., 8:54684
Valdivia, A.A., *See* Samet, J.M., 8:55033
Valentine, A.M., Radiological planning and implementation for nuclear facility decommissioning, 8:53624 (RA;US)
See Garde, R., 8:53613
Vallepin, *See* Geffroy, 8:53560
Van Allen, J.A., Absorption of energetic protons by Saturn's ring g. Progress report for FY83, 8:55085 (R;US)
Van Berchem, P., *See* Kypreos, S., 8:54056
Van Cott, H., *See* Burgy, D., 8:53944, 8:53945
van deer Leeden, G.A., *See* Young, R.T., 8:54283
van der Leeden, G.A., *See* Young, R.T., 8:53764
Van Doren, C., Bactericidal effect of ultraviolet irradiation, 8:55045 (RA;FR;In French)
van Lint, V.A.J., Techniques for source-region EMP experiments at AURORA. Contractor report, 8:54756 (R;US)
van Slyke, H., *See* Green, M.A., 8:54477
Vandegrift, G.F., *See* Pecina, R.J., 8:53431
VanDenAvyle, J.A., Assessment of cast irons for structural components in nuclear material transportation systems, 8:54384 (RA;US)
Vanderborgh, N.E., Effects of additives upon the thermal degradation of subbituminous coals, 8:53353 (J;NL)
VanDevender, J.P., Light-ion-beam fusion, 8:55305 (R;US)
See Mendel, C.W. Jr., 8:55297
Vanier, P.E., *See* Delahoy, A.E., 8:54290
Vannoni, M.G., *See* Gallup, D.R., 8:54028
Varadarajan, R.V., Impacts of transportation on a test and evaluation facility for nuclear waste disposal: a systems analysis, 8:53641 (RA;US)
Varadrajan, R.V., *See* Peterson, R.W., 8:53555
Varaiya, P., *See* Sastry, S., 8:53866
Varwig, R.L., *See* Spencer, D.J., 8:54492
Vasil'eva, Eh.V., *See* Bogdzel', A.A., 8:54705
Vasinyuk, I.E., Unified system of collection, processing of experimental information and control, 8:54678 (R;SU;In Russian)
Vaughan, R.A., Licensing experience in obtaining approval of Type B packaging, 8:53484 (RA;US)
Velicky, R.W., Anomalous burning rate characteristics of composition B and TNT, 8:54853 (RA;US)
See Voreck, W.E., 8:54856
Venier, C.G., Facile reaction/extraction of coal with supercritical fluids. Quarterly technical progress report, April 1, 1983-June 30, 1983, 8:53344 (R;US)
Venkata, S.S., Investigation of small wind-turbine induction generators. Final technical report, September 16, 1980-December 31, 1982, 8:53846 (R;US)
Verluise, F.M.P., Modular roofing component for collecting solar radiation, 8:53814 (P;FR;In French)
Vernon, R.J., Beam waveguide launcher for electron cyclotron resonance plasma heating, 8:55264 (RA;US)
Verzino, W.J., *See* Vanderborgh, N.E., 8:53353
Vetter, D.E., Radiological assistance teams, 8:53707 (RA;US)
Vetter, R.J., *See* Landolt, R.R., 8:53685
Veya, R., *See* Hess, E., 8:54011
Vidale, R., *See* Charles, R.W., 8:55082
Viecenz, H.J., Module container system for LAW disposal, 8:53636 (RA;US)
Packaging, transportation and disposal of nuclear parts from decommissioning of N.S. OTTO HAHN, 8:54018 (RA;US)
Radwaste receiving and handling facilities for mine disposal, 8:53640 (RA;US)
See Lettnin, H.K.J., 8:53992
Vigil, M.G., Experimental impact and puncture evaluation of the prototype quarter scale TRU transport package, 8:54424 (RA;US)
Puncture protection for the TRUPACT system, 8:54389 (RA;US)
See Gablin, K.A., 8:54426
See Nelsen, J.M., 8:54440
Villareal, R.J., *See* Grenier, R.M., 8:54446
Vincent, M.A., Molecular and electronic structure of phosphonium cyclopropylide ($H_3P = C(CH_2)_2$): a theoretical study, 8:54325 (J;US)
Vincent, R.L., *See* Todd, L.L., 8:54148
Viskanta, R., *See* Anderson, D.W., 8:53370
Vladimirov, V.A., *See* Vagov, V.A., 8:54693
Vliet, G.C., *See* Askey, J., 8:53811
Vo Van Thuan, *See* Alfimenkov, V.P., 8:55180
Voeke, R.W., *See* Gilbert, T.L., 8:53611
Vodop'yanov, A.S., Spectrometer for studying spontaneous radiation emitted during high-energy electron and positron channeling in monocrystals, 8:54704 (R;SU;In Russian)
Voelz, G.L., *See* Wilkinson, G.S., 8:55027
Voevodin, M.A., Dubna synchrophasotron. Operation and improvement (quarter 1, 1982), 8:54612 (R;SU;In Russian)
Vohra, K.G., Development of a model for the assessment of radiation dose received by workers in the transport of radioactive materials, 8:53702 (RA;US)
Voigt, A.F., *See* Link, B.W., 8:53991
Vojtech, O., Study of borate-phosphate system for fixation of nuclear power plant wastes, 8:53682 (R;CS;In Czech)
Vojtkovska, I., *See* Vodop'yanov, A.S., 8:54704
Voldner, E.C., *See* Shannon, J.D., 8:54893
Volkov, N.G., *See* Byalko, A.A., 8:55115
See Churakov, A.K., 8:55336
Volpe, R.L., *See* Nelson, J.D., 8:53655
von Dobschuetz, P., *See* Alter, U., 8:53717
von Goeler, S., *See* Bitter, M., 8:55246
VonLaven, S., *See* Segall, S.B., 8:54500
Vorbrugg, W., *See* Kriks, H.J., 8:53982
Voreck, W.E., Exploding foil shock sensitivity test, 8:54856 (RA;US)
Vorob'ev, E.D., Effect of high-energy ion irradiation on aluminium creep, 8:54217 (R;SU;In Russian)
Vosahlo, L., *See* Hejna, J., 8:53903
Votaw, E.F., *See* Cole, B.M., 8:53557
Vygen, P., *See* Christ, B., 8:53935
Vyshensky, S.V., Diagram summation method in Schwinger source theory, 8:55159 (R;SU)

W

Waddington, D., *See* May, E.K., 8:53792
Wade, J.E., *See* Baker, R.W., 8:53843, 8:53844
Wagemann, R., *See* Krueger, K., 8:53887
Wagenaar, F.L., *See* Neckers, D.C., 8:53740
Wagner, J., *See* McClelland, J.B., 8:55176
Wagner, R.L., *See* Cox, B., 8:54716, 8:54719
Wagoner, D.E., *See* Cox, B., 8:54716, 8:54719
Wagschal, J.J., *See* Cacuci, D.G., 8:53924, 8:53925
Walting, J.F., Disordering under HVEM irradiation, 8:54224 (RA;US)
Wakabayashi, J., Diagnostic system utilizing the fluctuated detector signals, 8:53895 (RA;JP;In Japanese)

Walawender, W.P., *See* Fan, L.T., 8:54526
Walbridge, E.W., *See* Pecina, R.J., 8:53431
Walburg, C.H., Effects of reservoir releases on water quality, macroinvertebrates, and fish in tailwaters: field study results. Final report, 8:53755 (R;US)
Waldon, M.G., Analysis of tiltmeter monitoring of Northern Louisiana salt domes, 8:53666 (RA;US)
Walker, E., *See* Glenn, R.D., 8:53628
Walker, P.L., *See* Davis, A., 8:53399
Walko, R.J., *See* Bacon, F.M., 8:55119
Wallace, A., *See* Hunter, R.B., 8:54914
Wallace, R.K., Nuclear physics problems for accreting neutron stars, 8:55095 (R;US)
Wallace, S.A., Process for recovering niobium from uranium-niobium alloys, 8:53687 (P;US)
Walsh, J., *See* Neely, N., 8:54942
Walters, L.C., *See* Porter, D.L., 8:55283
Walton, B.T., Use of the cricket embryo (Acheta domesticus) as an invertebrate teratology model, 8:55069 (R;US)
Wampler, W.R., Retention and thermal release of deuterium implanted in beryllium, 8:55303 (R;US)
Wan, E.I., Technical and economic assessment of liquid-fuel production from biomass. Final research report, 8:53774 (R;US)
Wang, C.L., Bandpass x-ray diode and x-ray multiplier detector, 8:54778 (P;US)
Wang, D., Investigation of a high-temperature reactor with a central region of graphite-spheres, 8:53918 (R;DE;In German)
Wang, R., Refractory-metal stabilized amorphous stainless steel. Part 1. Formation and stability of amorphous stainless steel with W or Ti, 8:54249 (J;GB)
Wang, T.W., *See* Liou, R.S., 8:55051
Ward, B.F.L., Observability of heavy Higgs bosons, 8:55156 (J;IT)
Ward, G.D., In situ production of heavy oil from Kentucky tar sands, 8:53457 (RA;US)
Ward, J.F., *See* Shanks, H.R., 8:54274
Ward, W.E., *See* Bostwick, L.E., 8:53335
Wardwell, R.E., *See* Nelson, J.D., 8:53654, 8:53655
Warming, L., Weathering and decontamination of radioactivity deposited on asphalt surfaces, 8:54345 (R;DK)
Warner, I.M., Characterization of polynuclear aromatic compounds in petroleum-refining localities. Progress report, September 1, 1982-November 30, 1983, 8:54880 (R;US)
Warren, R.W., Los Alamos free-electron-laser oscillator experiment: plans and present status, 8:54511 (R;US)
Results of the Los Alamos free-electron laser experiment, 8:54513 (J;US)
Warren, W.R., *See* Durran, D.A., 8:54494
Wasywich, K.M., *See* Naqvi, S.J., 8:53596
Watanabe, A., *See* Waxweiler, R.J., 8:55031
Watanabe, F., New small gauge for ultra high vacuum, 8:54547 (RA;JP;In Japanese)
Watanabe, S., *See* Miyakawa, S., 8:53972
Watson, E.C., *See* Denahm, D.H., 8:53643
Watson, E.E., Cell labeling: radiation dose and effects, 8:55047 (J;US)
Watson, J., *See* Hudson, D.H., 8:55018
Watson, J.E. Jr., *See* Checkoway, H., 8:55008
See Strom, D.J., 8:55020
Watson, J.L., *See* Howe, P.M., 8:54865
Watson, L., *See* Campbell, D.K., 8:53839
Watson, R.E., Volume effects in transition metal alloying, 8:54251 (J;US)
Watt, R.D., *See* Green, M.A., 8:54477
Watts, A.C., *See* Andreas, R.D., 8:53436
Watts, J., *See* Lyall, H.G., 8:54396
Watts, J.R., *See* Corey, J.C., 8:54929
Watumull, R., Solar hot-water heaters, 8:53800 (RA;US)
Watzel, G.V.P., Decommissioning of Unit A of the nuclear power plant Gundremmingen and its conversion to a condition of protective storage, 8:54016 (RA;US)
Waxweiler, R., *See* Roscoe, R.J., 8:53692
Waxweiler, R.J., Mortality patterns among a retrospective cohort of uranium mill workers, 8:55031 (RA;US)
See Rinsky, R.A., 8:55010
Webb, D.V., Linear accelerator facility, 8:54595 (RA;AU)
Weber, H.W., *See* Hahn, P., 8:55282
Weber, P.M., *See* Maass, K.E., 8:53698
Weber, W.J., Damage ingrowth and recovery in alpha-irradiated CaF_2, SrF_2, and BaF_2, 8:54282 (J;GB)
Webster, E.W., Development of cancer risk estimates from epidemiologic studies, 8:55024 (RA;US)
Webster, G.D., Shakedown and preliminary calibration tests for the fuel engine evaluation system using the Km914A Sachs Rotary Combustion Engine. Technical note, 8:54196 (R;US)
Webster, L.J., *See* LaBar, M.P., 8:53893
Wee, C.S., *See* Shirley, C.G., 8:53571
Wehner, G., Importance of reportable events on the public acceptance, 8:53535 (RA;US)
See Alter, U., 8:53469
Wehring, B.W., *See* Gerdin, G.A., 8:55242
Weibrecht, R., 10 years Rossendorf Tandem, 8:54624 (R;DD;In German)
Weiner, R.E., In vitro transfer of Ga-67 from transferrin to ferritin, 8:54347 (J;US)
Weingart, R.C., *See* Honodel, C.A., 8:54819
Weirick, L.J., Corrosion response of downhole steam generator assembly and instrumentation and supply line tubings at Long Beach field test, 8:53434 (R;US)
Weisshaar, D.E., Application of Kelgraph to electrochemical detectors for flow injection analysis and high performance liquid chromatography. Technical report, 8:54299 (R;US)
Weissman, S.H., *See* Leisher, W.B., 8:54410
Welles, B.W., Analyses of notification, routing, and packaging for shipments of nuclear materials, 8:53515 (RA;US)
Analysis of NEPA/CEQ requirements with respect to nuclear materials packaging and transportation, 8:53537 (RA;US)
Wells, A.H., *See* Meinert, N.M., 8:54469
Wells, J.E., *See* Bohn, M.P., 8:54032
Welzel, R.G., *See* Boon, J.J., 8:54937
Wen, C.Y., *See* Rao, P.R., 8:54559
Wendt, R.L., *See* Giles, G.E., 8:54138
Weng, W.T., *See* Month, M., 8:54575
Wesely, M.L., Improved estimates of sulfate dry deposition in eastern North America, 8:54879 (R;US)
Wessman, N.J., *See* Stevens, C.G., 8:54341
West, G.T., *See* Stanton, P.L., 8:54852
Westberg, H.H., *See* Sexton, K., 8:54885
Westmacott, K.H., *See* Ackland, D., 8:54226
See Dahmen, U., 8:54225
See Fisher, R.M., 8:54227, 8:54766
Westwater, J.W., Conditions for dropwise condensation on electroplated gold. Final report, February 15, 1980-August 14, 1983, 8:54209 (R;US)
Weygand, D.P., *See* Gordon, H.A., 8:54728
Weymann, J., *See* Maass, K.E., 8:53698
Whatmore, C.E., *See* Coley, G.D., 8:54787
Whicker, F.W., *See* Markham, O.D., 8:54930
Whitby, K.T., *See* Richards, L.W., 8:54883
White, J., Cooperative government/nuclear industry intervention in achieving motor carrier rules uniformity for transporting radioactive material, 8:53518 (RA;US)
Electron damage in Zr and Ti, 8:54228 (RA;US)
White, M.C., IAEA's role in achieving and assuring safety in the transport of radioactive materials, 8:53482 (RA;US)
White, T., EBT-S ECH transmission systems, 8:55269 (RA;US)
Whitesides, G.E., Standard problem exercise to validate criticality codes for spent LWR fuel transport container calculations, 8:54462 (RA;US)
Whitlock, R.R., *See* Rosen, M.D., 8:55315
Whitman, M., Feasibility of co-disposing low-level radioactive waste with uranium mill tailings and/or FUSRAP waste, 8:53644 (R;US)
Whitson, J.C., *See* El Nadi, A.M., 8:55240
Whittier, J., Leasing of federal surface lands for direct-use geothermal-energy developments, 8:53840 (R;US)
Whittier, J.S., *See* Amimoto, S.T., 8:54505
Wideman, D.C., Heat conduction in rarefied gases between concentric cylinders: arbitrary accommodation on both surfaces, 8:53816 (RA;US)
Widner, M.M., *See* Mendel, C.W. Jr., 8:55297
Wieser, K.E., Drop from the reactor building crane: an event covered by the 9-m drop test requirement, 8:54423 (RA;US)
Elastomere gasket: a black sheep for quality assurance measures, 8:54457 (RA;US)
Guide to quality assurance measures for manufacturing and use of RAM packagings, 8:54452 (RA;US)
Invesigations on shock absorbers for Type B packagings, 8:54465 (RA;US)
Wiggs, L., *See* Wilkinson, G.S., 8:55027
Wight, A., Low-level waste transportation: legislative issues in the northeast United States, 8:53536 (RA;US)
Wigle, D.T., *See* Letourneau, E.G., 8:55035

Wilbur, D.S., Regiospecific incorporation of bromine and iodine into phenols using (trimethylsilyl)phenol derivatives, 8:54333 (J;US)
Wilde, S., *See* Reimers, R.M., 8:54620
Wildung, R.E., *See* Garland, T.R., 8:54928
Wilenitz, I., *See* Moskowitz, P.D., 8:53788
Wilhelm, H., *See* Neef, R.D., 8:53883
Wilhelm, R., *See* Thumm, M., 8:55276
Wilkes, J.S., *See* Pugh, H.L., 8:54793
Wilkinson, F., Rate constants for the decay and reactions of the lowest electronically excited singlet state of molecular oxygen in solution, 8:54343 (J;US)
Wilkinson, G.S., Mortality among plutonium and other workers at a nuclear facility, 8:55027 (RA;US)
Wilks, M.J., *See* Cooper, M.B., 8:54950
Willard, D.H., *See* Ballou, J.E., 8:55064
Willen, E., *See* Engelmann, R., 8:54576
See Herrera, J., 8:54632
Williams, D.C., *See* Tarrer, A.R., 8:53338, 8:53339, 8:53340, 8:53341
Williams, D.E., Sulfur oxides control burner. Final report Oct 79-Sep 81, 8:53420 (R;US)
Williams, D.H., Utility planning for decommissioning, 8:54010 (RA;US)
Williams, G., *See* Cristy, M., 8:55216
Williams, G.A., *See* Cooper, M.B., 8:54920, 8:54921
Williams, J.M., *See* Schultz, A.J., 8:54318
Williams, R.A., *See* Todd, L.L., 8:54148
Williams, R.L., Overview of the wind-energy project at Kahuku Seafood Plantation, 8:54108 (RA;US)
Williams, T.A., *See* Hane, G.J., 8:54175
Willis, C.A, New NRC methodology for estimating biological risks from exposure to ionizing radiation, 8:55019 (RA;US)
Willis, W.J., Experience of the axial field spectrometer at the CERN ISR, 8:54707 (RA;US)
Nuclear beams and targets, 8:55198 (RA;XC)
Wilmot, E.L., Analysis of population densities along transportation routes, 8:53487 (RA;US)
See Larson, D.W., 8:53576
See Luna, R.E., 8:53498
See Madsen, M.M., 8:53486, 8:53523
See Moore, R.L., 8:54421
See Peterson, R.W., 8:53555
See Shirley, C.G., 8:53514
Wilson, B.W., Identification of mutagenic constituents in coal combustion fly ash, 8:53428 (R;US)
Wilson, D.G., Shortcoming of the explicit solution for the binary alloy solidification problem, 8:54248 (J;US)
Wilson, D.R., MHD generator off-design performance and NO/sub x/ chemical-kinetics analysis, 8:54116 (R;US)
Wilson, E.G., *See* Costello, J.M., 8:53601
Wilson, G.V., Characteristics of tar sands of Alabama, 8:53453 (RA;US)
Wilson, I., *See* Goodings, A., 8:53882
Wilson, J.A., *See* Ashmore, J.P., 8:55040
Wilson, O.J., Detector for use in high energy bremsstrahlung shielding studies, 8:54660 (RA;AU)
Tissue to air ratios for open-cut uranium mine employees: a simulation using circular plane sources, 8:55000 (RA;AU)
See Young, J.G., 8:54999
Wilson, R.K., Double porosity model for acoustic wave propagation in fractured-porous rock, 8:55228 (R;US)
Wilton, C., *See* Tansley, R.S., 8:54373
Wimmers, M., *See* Krueger, K., 8:53887
Winans, R.E., Reactivity and characterization of coal macerals, 8:53378 (J;US)
Windig, W., *See* Boon, J.J., 8:54937
Wingert, V., Emergency response guidelines for state and local governments for radioactive material transportation accidents, 8:53706 (RA;US)
Winkelstein, W. Jr., Epidemiological methods: a brief review, 8:55005 (RA;US)
Winkenbach, B., *See* Leithner, D.E., 8:53885
Winston, J.G., *See* Warren, R.W., 8:54511, 8:54513
Wirth, E., Applicability of the ^{14}C-specific activity model, 8:55061 (J;GB)
Wise, K.N., *See* Leach, V.A., 8:53467
Wisniewski, J., The potential acidity associated with dews, frosts, and fogs, 8:54915 (J;NL)
Witherell, M.S., Lepton nonconservation and double beta decay, 8:55125 (RA;US)
Witschi, H.R., Problems of toxicological testing of complex mixtures, 8:53424 (R;US)
Wittenbrock, N.G., *See* Moore, E.B., 8:54012
Wittry, D.B., Investigation of impurity concentrations and electrical properties near interfaces. Final report 1 Feb 81-31 Aug 82, 8:55102 (R;US)
Wobber, F.J., Utilization of snow-enhancement techniques for acquisition of geological and geo-environmental information from ERTS imagery, 8:55079 (R;US)
Wochele, J., *See* Kypreos, S., 8:54056
Wohlers, H.D., *See* Moore, K.J., 8:54340
Wolf, A.P., *See* Som, P., 8:54969
Wolf, K.L., *See* Renfordt, R.E., 8:55194
Wolf, M.H., *See* Nuff, G.A., 8:54316
Wolf, S.H., *See* Checkoway, H., 8:55008
Wolfe, J.P., Measurement of high mobilities and strain confinement of long-lived free excitons in Cu20. Interim scientific report, 8:54252 (R;US)
Wolfe, M.L., Initial study of wild horse and burro demography: determination of pregnancy and lactation rates in various herds. Final report, 8:54908 (R;US)
Wolters, D., *See* Anspach, W., 8:54382
Wong, B.A., *See* Hoover, M.D., 8:53690
See Newton, G.J., 8:53691
Wong, C.P.C., *See* Hopkins, G.R., 8:55291
Wong, E.W., *See* Bostwick, L.E., 8:53335
Wong, V., *See* Reese, J. Jr., 8:53819
Woo, H.H., Stress analysis for a spent fuel shipping cask, 8:54448 (RA;US)
Wood, B.J., Study of the role of alkali metal salts as char gasification catalysts by Knudsen cell mass spectrometry, 8:53356 (J;US)
Wood, R.F., *See* Young, R.T., 8:54283
Wood, R.J., *See* Bailey, J.M., 8:55261
Woodruff, J.L., HGP - a geothermal project, 8:53835 (RA;US)
Woodruff, W.L., Burnup-dependent cross-section data for research reactors, 8:53957 (R;US)
Neutronics and thermal-hydraulics analysis of KUHFR, 8:53961 (R;US)
PARET code and the analysis of the SPERT I transients, 8:54017 (R;US)
See Shiroya, S., 8:53964
Woodward, R., *See* Jaeaeskelaeinen, M., 8:55192
Woolfenden, W.R., *See* Pugmire, R.J., 8:53375
Woolum, D.S., *See* Benjamin, T.M., 8:55094
Woosley, S.E., *See* Wallace, R.K., 8:55095
Worden, R.M., *See* Strandberg, G.W., 8:53741
Wormley, S.J., *See* Thompson, D.O., 8:54536
Wray, M., *See* Checkoway, H., 8:55008
Wrenn, G.E. Jr., Method for depositing a uniform layer of particulate material on the surface of an article having interconnected porosity, 8:54369 (P;US)
Wright, B., *See* Price, M.S.T., 8:54429
Wright, H.A., *See* Todo, A.S., 8:55206
Wright, M.G., *See* Naqvi, S.J., 8:53596
Wrighton, M.S., *See* Bagilo, J.A., 8:53784
See Calabrese, G.S., 8:54313
Wu, K., *See* Spindle, A., 8:55060
Wu, K.C., Helium refrigerator with features for supercritical-pressure cooling, 8:54375 (R;US)
See Schlafke, A.P., 8:54376
Wu, S., Mesh-initiated large area detonator with magnetic flux compression current generator as source, 8:54842 (RA;US)
Wu, S.T., *See* Dryer, M., 8:55092
Wullaert, R., *See* McConnell, P., 8:54379
Wurtele, J.S., *See* Paul, A.C., 8:54594
Wykes, P., *See* Fry, J., 8:54659
Wyman, K., *See* Falkowski, P.G., 8:54967
Wynveen, R.A., Waste identification, characterization and disposal during the D & D of a non-reactor nuclear facility, 8:53627 (RA;US)

Y

Yaakobi, B., *See* Liboff, R.L., 8:54506
Yaari, A., *See* Cacuci, D.G., 8:53925
Yaffo, J.E., OTEC power for Hawaii, 8:53796 (RA;US)
Yalovoj, I.N., *See* Zabolotin, V.P., 8:54584
Yamakawa, H., *See* Tasuda, M., 8:54438
Yamamoto, A., Study on low energy intense kaon beam, 8:54616 (R;JP)
Yamamoto, H., *See* Ohtani, H., 8:53899
Yamamoto, M., *See* Ebisu, T., 8:54412
See Nishino, S., 8:54541
Yamane, Y., *See* Murata, N., 8:53919
Yamanouchi, T., Fermilab fixed target program and schedule, 8:55130 (RA;XC)
Yamashita, T., *See* Smith, D.J., 8:54278
Yamin, P., *See* Engelmann, R., 8:54576
Yang, D.M., *See* Liou, R.S., 8:55051
Yang, R.T., *See* Desai, N.J., 8:54367
Yang, W.J.S., Technique for examining the fuel/cladding interface by TEM, 8:53897 (R;US)
Yang, W.K., *See* Liou, R.S., 8:55051

Yanichko, P., *See* Grishin, V.G., 8:55174
Yano, H., Computerized art plotting system. Vol. I. Horizontal bar charts (second edition), 8:55341 (R;US)
Yao, N.P., *See* DeLuca, W.H., 8:54046
See Miller, J.F., 8:54047
Yarborough, R.D., Shipping papers: cornerstone of radioactive material transportation, 8:53526 (RA;US)
Yashima, H., Identification of nuclear reactor characteristics by the reactor noise analysis, 8:53943 (RA;JP;In Japanese)
Yasuda, M., *See* Abe, H., 8:54441
Yasuda, T., *See* Kobayashi, K., 8:53947
Yasuda, Y., *See* Maki, Y., 8:54459
Yazicigil, H., *See* Sendlein, L.V.A., 8:53400
Yee, G., *See* Delanny, F., 8:53358
Yeivin, Y., *See* Cacuci, D.G., 8:53924
Yergin, D.H., Global aspects of energy supply and demand, 8:54079 (RA;US)
Yeung, E.S., Ultrasensitive optical rotation and refractive-index measurements, 8:54294 (R;US)
Yie, G.G., Cutting concrete with abrasion jet, 8:53623 (RA;US)
Yiftah, S., Minutes of the twelfth INDC meeting, Vienna, 5-9 October 1981, 8:55161 (R;XA)
Yoh, J., Calorimetric physics in the presence of multiple events, 8:54729 (RA;US)
Yokosawa, A., Nucleon-nucleon interactions and polarized-beam (both proton & antiproton) facilities at LAMPF II, 8:55135 (R;US)
Yokoya, K., Improvement of radiative polarization in plane storage rings, 8:54591 (R;JP)
See Chao, A.W., 8:54643
Yokoyama, H., Widely useful stainless steel forging B(U) packaging, 8:54418 (RA;US)
Yoneda, M., Energy management in a health-care institute, 8:54131 (RA;US)
Yonekura, Y., *See* Som, P., 8:54969
Yoshihara, T., Energy programs for Pacific territories, 8:54085 (RA;US)
Yoshikawa, S., Design of a helical-axis stellarator, 8:55320 (J;AT)
Yoshimura, H.R., Development of a large fire test facility for packaging thermal testing, 8:54443 (RA;US)
See Diggs, J.M., 8:53544
See Gablin, K.A., 8:54426
See Kikuchi, S., 8:53509
See Laub, B., 8:54403
See Sutherland, S.H., 8:54427
See Vigil, M.G., 8:54389
Yoshizawa, M., *See* Noda, A., 8:54582
Yossifon, S., *See* Szanto, M., 8:54470
Yost, F.G., Image analysis of particle perimeters, 8:54242 (J;US)
Young, B., *See* Mika, J.F., 8:54970
Young, F.C., *See* Mehlhorn, T.A., 8:55304
Young, J.C., *See* Cooper, D.R.C., 8:54155
Young, J.F., *See* Harris, S.E., 8:54498
Young, J.G., Evaluation of the radiation doses to uranium mine employees exposed to external gamma radiation, 8:54999 (R;AU)
See Bartnik, D.L., 8:54758
See Wilson, O.J., 8:55000
Young, L.M., *See* Warren, R.W., 8:54513
Young, R.T., Characterization of excimer laser annealing of ion implanted Si, 8:54283 (J;US)
Semiconductor processing with excimer lasers, 8:53764 (R;US)
Young, T.R. Jr, *See* Sheeley, N.R. Jr, 8:55088
Youngberg, A.D., *See* Rich, F.J., 8:53380
Youngman, R.A., *See* Mitchell, T.E., 8:54258
Yount, J.A., Some design considerations for cask handling at large-scale shipping and receiving facilities, 8:53713 (R;US)
See Shirley, C.G., 8:54405
Youtcheff, J.S., Dependence of liquefaction behavior on coal characteristics. Part IV. Contributions to the understanding of the phenomenology of coal liquefaction. Final technical report, March 1981-February 1984, 8:53342 (R;US)
Yu, J.M., *See* Feng, K.K., 8:54814
Yule, T.J., *See* Cox, S.A., 8:54750
Yust, C.S., *See* Finch, C.B., 8:54265
Yutani, N., Behavior of particles in a liquid-solid fluidized bed, 8:54527 (J;US)

Z

Zabel, H., *See* Kamitakahara, W.A., 8:54253
Zabolotin, V.P., Residual magnetic field in the magnet of the Dubna synchrophasotron and its compensation, 8:54584 (R;SU;In Russian)
See Voevodin, M.A., 8:54612
Zaccor, J.V., Industrial hardening: 1982 technical status report. Final report, 8:55347 (R;US)
Zachary, L.W., *See* Thompson, R.B., 8:54537
Zaffiro, B., *See* Cuzzaniti, M., 8:53585
Zamrij, V.N., *See* Vagov, V.A., 8:53940
Zantopp, D., *See* Sondericker, J.H., 8:54374
Zarubin, A.V., *See* Golovin, V.M., 8:54585
Zbasnik, J.P., *See* Hoard, R.W., 8:55310
Zeis, L.A., *See* Bostwick, L.E., 8:53335
Zelenin, V.E., *See* Bryukhanov, N.S., 8:54684
Zeman, P., *See* Bechvarzh, F., 8:55186
Zenin, V.A., Measurement of the threshold and nominal values of HF fields in the cavities of the linac with HF focusing, 8:54578 (R;SU;In Russian)
Zhang, G.R., *See* Wu, S., 8:54842
Zhang, G.T., *See* Levenspiel, O., 8:53776
Zharkov, A.Yu., *See* Gerdt, V.P., 8:55225
Zherebtsov, A.V., Three-dimensional electrostatic field computation for an accelerating structure with spatial-uniform focusing, 8:54577 (R;SU;In Russian)
Zhuang, J., Structure and magnetism of Eu_2IrD_5, 8:54241 (J;US)
Ziebs, J., *See* Aurich, D., 8:54380
Zielen, A.J., *See* Tobin, R.L., 8:53859
Zilm, K.W., *See* Alemany, L.B., 8:54334, 8:54335
Zimmer, A., *See* Moore, R.L., 8:54421
See Vigil, M.G., 8:54389
Zimmerman, N.J., *See* Landolt, R.R., 8:53685
Zinov'ev, L.P., *See* Voevodin, M.A., 8:54612
Zipper, W., Fusion of heavy ions in an interaction potential model, 8:55168 (R;PL;In Polish)
Zoe, J., *See* Cheret, R., 8:54831
Zoglo, D., *See* Ouimette, D.R., 8:55036
Zombori, P., *See* Andrasi, A., 8:54925
Zook, A.C., *See* McGonnagle, W.J., 8:54731
Zoski, G.D., *See* Bagilo, J.A., 8:53784
Zsido, J., *See* Baranyai, A., 8:53941, 8:53942
Zumbrunnen, D.A., *See* Anderson, D.W., 8:53370
Zumwalde, R.D., *See* Rinsky, R.A., 8:55010
Zurn, D.E., *See* Boggs, T.L., 8:54804
Zwick, S.A., *See* Fee, D.C., 8:54120

SUBJECT INDEX

The subject index is based on the use of subject descriptors selected from a controlled thesaurus of terms (DOE/TIC-7000). Subject descriptors and qualifiers (subheadings) are selected and presented in the following format:

SUBJECT DESCRIPTOR
Qualifier
Title, (supplementary information), citation number, (R:US)

The notations in the final parentheses indicate the type of document, e.g., R for Report; the country of publication, e.g., US; and the language if other than English, e.g., In German. Tables of document types and country of publication codes appear after the indexes.

The title may be supplemented with additional words, or a phrase, if it appears additional information would be helpful. In cases for which the title contains little or no information related to the subject entry, it may be replaced entirely by the supplementary information. A qualifier is not always required, and in such cases the title will follow the unqualified subject descriptor.

The descriptors selected for use as subject terms are generally the names of specific materials, things, or processes. To the extent possible, a qualifier is selected to describe the properties of, or processses applied to, the subject term.

Index entries are selected to indicate the important ideas and concepts presented in a document, rather than words that may appear in the text. Within the available thesaurus terms, the most probable or logical place to look for typical information is selected. "See references" are included to guide users from synonymous terms or phrases to the descriptor selected as a subject heading for the concept. (e.g. Pipeline Quality Gas see HIGH BTU GAS). "See also references" are used to indicate where to find references to subject concepts that are narrower, broader, or related to a particular subject heading. To complete an exhaustive search of a given subject, all such headings should be reviewed. Copies of DOE/TIC-7000, the Subject Thesaurus, are available from the National Technical Information Service (NTIS), U. S. Department of Commerce, Springfield, VA 22161.

A

ABANDONED SITES
Decommissioning
Decontamination of the Frankford Arsenal, 8:53614 (RA;US)
Gnome site decontamination and decommissioning project, 8:53618 (RA;US)

A-BOMB SURVIVORS
Carcinogenesis
Follow-up studies on A-bomb survivors: implications for radiological protection, 8:55016 (RA;US)
Chromosomal Aberrations
Follow-up studies on A-bomb survivors: implications for radiological protection, 8:55016 (RA;US)

ABSORBED DOSES
See RADIATION DOSES

ABSORBERS (SOLAR)
See SOLAR ABSORBERS

ABSORPTION (ROOT)
See ROOT ABSORPTION

ACCELERATOR FACILITIES
Free Electron Lasers
Los Alamos free-electron-laser oscillator experiment: plans and present status, 8:54511 (R;US)
Planning
Perspectives in high energy nuclear collisions, 8:55190 (R;US)

ACCELERATORS
See also COLLECTIVE ACCELERATORS
HEAVY ION ACCELERATORS
LINEAR ACCELERATORS
PARTICLE BEAM FUSION ACCELERATOR
CAMAC System
Unified system of collection, processing of experimental information and control, 8:54678 (R;SU;In Russian)
Meetings
Scientific program and abstracts, 8:54604 (R;US)

ACCELEROMETERS
Design
Double resonator cantilever accelerometer, 8:54779 (P;US)
Resonators
Double resonator cantilever accelerometer, 8:54779 (P;US)

ACCIDENTAL IRRADIATION
See RADIATION ACCIDENTS

ACCOUNTING
Chemical Industry
VEBA-report on activities in 1980, 8:55326 (R;DE;In German)
Electric Power Industry
VEBA-report on activities in 1980, 8:55326 (R;DE;In German)
Electric Utilities
VEBA-report on activities in 1980, 8:55326 (R;DE;In German)
Petroleum Industry
VEBA-report on activities in 1980, 8:55326 (R;DE;In German)

ACES
See QUARKS

ACETATES
Biodegradation
Methanogenesis from acetate, a key intermediate in nature. Third year report, 8:54979 (R;US)

ACETONE
Gas Chromatography
Identification and separation of the organic compounds in coal-gasification condensate waters, 8:53371 (R;US)
Liquid Column Chromatography
Identification and separation of the organic compounds in coal-gasification condensate waters, 8:53371 (R;US)
Mass Spectroscopy
Identification and separation of the organic compounds in coal-gasification condensate waters, 8:53371 (R;US)

ACETYLENE
Pyrolysis
Carbon-particle generator, 8:53828 (P;US)

ACHONDRITES
Age Estimation
Microprobe analyses of rare-earth-element fractionation in meteoritic minerals, 8:55094 (R;US)

ACID RAIN
The potential acidity associated with dews, frosts, and fogs, 8:54915 (J;NL)
Environmental Effects
Combined effects of atmospheric deposition, internal acid production, and harvesting on nutrient gains and losses from forest ecosystems, 8:54909 (R;US)
Forecasting
Improved estimates of sulfate dry deposition in eastern North America, 8:54879 (R;US)

ACIDS (INORGANIC)
See INORGANIC ACIDS

ACIDS (ORGANIC)
See ORGANIC ACIDS

ACOUSTIC TESTING
See also ULTRASONIC TESTING
Acoustic-velocity measurements in materials using a regenerative method, 8:54775 (P;US)

ACTINIDE NUCLEI
See also AMERICIUM 241
AMERICIUM 243
CURIUM 242
CURIUM 243
CURIUM 244
CURIUM 245
CURIUM 246
CURIUM 247
CURIUM 248
PLUTONIUM 238
PLUTONIUM 239
PLUTONIUM 240
THORIUM 228
THORIUM 230
THORIUM 232
URANIUM 238
Decay
Fifth research coordination meeting on the measurement and evaluation of transactinium isotope nuclear data. Central Bureau for Nuclear Measurements, Geel, Belgium, 1-3 September 1982. Summary report, 8:55195 (R;XA)

ACTIVATED CARBON
Sorptive Properties
Removal of radon from water using granular activated carbon adsorption. Annual report, 8:54300 (R;US)

ADENOCARCINOMAS
See CARCINOMAS

ADHESIVES
Mechanical Tests
Hierarchical trees for accelerated aging studies, 8:54204 (R;US)

ADIPIC ACID
Full-scale utility FGD (flue gas desulfurization) system adipic acid demonstration program. Volume 1. Process results. Final report Jun 80-Nov 82, 8:53391 (R;US)
Full-scale utility FGD (flue gas desulfurization) system adipic acid demonstration program. Volume 2. Continuous emissions monitoring results. Final report Jun 80-Nov 82, 8:53392 (R;US)

ADU
See AMMONIUM URANATES

ADVANCED GAS COOLED GRAPHITE MODERATED RE
See AGR TYPE REACTORS

AERE
Research Programs
Fundamental physics research at Harwell in the 1950s. 1. The Independent Research Group (Nuclear Physics Division), 8:55084 (R;GB)

AEROJET-GENERAL NUCLEONICS REACTORS
Reactor Decommissioning
Decommissioning of the Oregon State University AGN-201 Reactor, 8:53995 (RA;US)

AEROSOL MONITORING
Data Covariances
Source reconciliation of atmospheric aerosols, 8:54891 (J;NL)
Interlaboratory Comparisons
National Performance Audit Program. Ambient air audits of analytical proficiency, 1981, 8:54904 (R;US)

AEROSOLS
See also RADIOACTIVE AEROSOLS
Chemical Analysis
Characterization of polynuclear aromatic compounds in petroleum-refining localities. Progress report, September 1, 1982-November 30, 1983, 8:54880 (R;US)
Pollution Sources
Source reconciliation of atmospheric aerosols, 8:54891 (J;NL)
Sampling
Aerosols from metal cutting techniques typical of decommissioning nuclear facilities - experimental system for collection and characterization, 8:53691 (RA;US)
Characterization of polynuclear aromatic compounds in petroleum-refining localities. Progress report, September 1, 1982-November 30, 1983, 8:54880 (R;US)
Los Angeles field modeling and measurement study - 1978 (second year). Final report, 8:54884 (R;US)

AFFRI REACTOR
See AFRRI REACTOR

AFR STORAGE
See AWAY-FROM-REACTOR STORAGE

AFRRI REACTOR
Ventilation Systems
Safety analysis of modifications to upgrade the reactor ventilation system at Armed Forces Radiobiology Research Institute. Technical report, 8:53954 (R;US)

AGN REACTOR SERIES
See AEROJET-GENERAL NUCLEONICS REACTORS

AGR REACTOR (WINDSCALE)
See WAGR REACTOR

AGR TYPE REACTORS
See also HINKLEY POINT-B REACTOR
WAGR REACTOR
Coolants
Development of a device to measure coolant flow within CAGR instrumented fuel stringers, 8:53894 (R;XA)
Failed Element Detection
Fuel failure detection and location methods in CAGRs, 8:53889 (R;XA)

AIR
Breakdown
Air-breakdown limits for microwave-pulse propagation. Part I. Experiments, 8:54553 (R;US)
Microwave Radiation
Air-breakdown limits for microwave-pulse propagation. Part I. Experiments, 8:54553 (R;US)

AIR CONDITIONERS
Economic Analysis
Supplement to: March 1982 consumer products efficiency standards, engineering analysis and economic analysis documents, 8:54135 (R;US)
Efficiency
Supplement to: March 1982 consumer products efficiency standards, engineering analysis and economic analysis documents, 8:54135 (R;US)
Standards
Supplement to: March 1982 consumer products efficiency standards, engineering analysis and economic analysis documents, 8:54135 (R;US)

AIR CONDITIONING
See also SOLAR AIR CONDITIONING
Energy Efficiency
Proper engineering for energy conservation, 8:54132 (RA;US)

AIR INFILTRATION
Measuring Methods
Perfluorocarbon tracer method for air-infiltration measurements, 8:54146 (P;US)
Tracer Techniques
Perfluorocarbon tracer method for air-infiltration measurements, 8:54146 (P;US)

AIR POLLUTION
See also INDOOR AIR POLLUTION
Environmental Impacts
Detecting long-term ecological effects in forests and food chains, 8:54911 (R;US)
Environmental Transport
Effects of varying air trajectories on spatial and temporal precipitation chemistry patterns, 8:54895 (J;NL)
Long-Range Transport
Estimates for the long-range transport of air pollution, 8:54892 (J;NL)
Manuals
Atlas of source emission particles, 8:54876 (R;US)

AIR QUALITY
Standards
NO/sub x/ information book (Contains glossary), 8:54903 (R;US)

AIRBORNE PARTICLES
See PARTICULATES

AIRBORNE PARTICULATES
See PARTICULATES

AIRCRAFT
See also HELICOPTERS
Internal Combustion Engines
Effect of volatility on air-fuel ratio distribution and torque output of a carbureted light aircraft piston engine. Final report, May 1981-September 1982, 8:54197 (R;US)

ALABAMA
Oil Sand Deposits
Characteristics of tar sands of Alabama, 8:53453 (RA;US)
ALAP
See RADIATION PROTECTION
ALARA
All exposures shall be kept as low as reasonably achievable, economic and social factors being taken into account.
Recommendations
Guest editorial: concern over recent use of the ALARA philosophy, 8:55048 (J;GB)
ALARM DOSEMETERS
See RADIATION MONITORS
ALBEDO-NEUTRON DOSEMETERS
Calibration
Calibration of a special emergency neutron dosemeter based on organic solid-state track detectors, 8:55214 (R;DD;In German)
Design
Response of an area albedo neutron dosimeter, 8:54746 (J;GB)
Performance Testing
Response of an area albedo neutron dosimeter, 8:54746 (J;GB)
Sensitivity
Calculation of the neutron sensitivity of thermoluminescent detectors. 4. Lithium fluoride albedo dosemeter, 8:54741 (R;DD;In German)
ALBERTA
Oil Sand Deposits
Heavy oil and oil sands research and development in Alberta, Canada, 8:53458 (RA;US)
Oil Sand Industry
Heavy oil and oil sands research and development in Alberta, Canada, 8:53458 (RA;US)
ALCOHOLS
See also BENZYL ALCOHOL
BUTANOLS
ETHANOL
GLYCOLS
METHANOL
PROPANOLS
Gas Chromatography
Kinds and quantities of organic combustion products in solid and liquid wastes from a coal-fired power station, 8:53393 (R;US)
Mass Spectroscopy
Kinds and quantities of organic combustion products in solid and liquid wastes from a coal-fired power station, 8:53393 (R;US)
Mixtures
Assessment of ether and alcohol fuels from coal. Volume I. Summary. Final report, 8:53742 (R;US)
Synthesis
Assessment of ether and alcohol fuels from coal. Volume I. Summary. Final report, 8:53742 (R;US)
ALDEHYDO ACIDS
See CARBOXYLIC ACIDS
ALKALI METALS
See also CESIUM
LITHIUM
POTASSIUM
RUBIDIUM
SODIUM
Equations of State
Equations of state for the alkali metals, with generalizations to NaCl, 8:54276 (R;US)
ALKALINE FLOODING
See CAUSTIC FLOODING
ALKANES
See also BUTANE
2-3-DIMETHYLPROPANE
METHANE
OCTANE
PROPANE
Gas Chromatography
Development of an improved method for the analysis of pressure-core samples. Final report, 8:53432 (R;US)
Kinds and quantities of organic combustion products in solid and liquid wastes from a coal-fired power station, 8:53393 (R;US)
Mass Spectroscopy
Development of an improved method for the analysis of pressure-core samples. Final report, 8:53432 (R;US)
Kinds and quantities of organic combustion products in solid and liquid wastes from a coal-fired power station, 8:53393 (R;US)
ALKANOIC ACIDS
See CARBOXYLIC ACIDS
ALKENES
See also BUTENES
CYCLOALKENES
ETHYLENE
PROPYLENE
Chemical Reactions
Rate constants for the decay and reactions of the lowest electronically excited singlet state of molecular oxygen in solution, 8:54343 (J;US)
ALKENOIC ACIDS
See CARBOXYLIC ACIDS
ALKYLATES
See ALCOHOLS
ALLOY-A-286
Physical Radiation Effects
Helium damage in austenitic stainless steels, 8:54210 (R;US)
ALLOY-HD-8077
See NICKEL BASE ALLOYS
ALLOY-MA-754
See NICKEL BASE ALLOYS
ALLOY-MA-956
See IRON BASE ALLOYS
ALLOY-WAZ-16
See NICKEL BASE ALLOYS
ALPHA DETECTION
Si Semiconductor Detectors
Automated low-background alpha-counting system with large-area silicon detector, 8:54673 (R;US)
ALPHA PARTICLES
Emitted by nuclei.
Specifications
Specification for symbol for ionizing radiation, 8:55211 (R;MY)
ALPHA REACTIONS
Differential Cross Sections
One - and non-coplanar two - particle inclusive cross-sections from the ^{4}He + Pb reaction at 150 MeV/nucleon, 8:55193 (RA;FR)
Excitation Functions
Reactions induced on ^{93}Nb by α particles up to 140 MeV, 8:55182 (RA;FR)
ALPHA SPECTROMETERS
Design
Radon-222 and progeny measurements in typical east Tennessee residences, 8:54900 (J;GB)
ALPHA-BEARING WASTES
Classification
TRU waste assay instrumentation and applications in nuclear facility decommissioning, 8:53625 (RA;US)
Packaging
One dimensional foam thermal modeling of TRUPACT wall section, 8:54403 (RA;US)
Puncture protection for the TRUPACT system, 8:54389 (RA;US)
Radiation Hazards
Potential problems from shipment of high-curie content contact-handled transuranic (CH-TRU) waste to WIPP, 8:53580 (R;US)
Transportation Systems
Planning a transportation system for US defense transuranic waste, 8:53554 (RA;US)
Waste Transportation
Potential problems from shipment of high-curie content contact-handled transuranic (CH-TRU) waste to WIPP, 8:53580 (R;US)
ALRR REACTOR
Reactor Decommissioning
Decommissioning of Ames Laboratory Research Reactor, 8:53991 (RA;US)

ALTERNATE FUELS
See FUEL SUBSTITUTION
SYNTHETIC FUELS

ALUMINATES
Specific compounds, except those of significance to energy research and development, should be indexed by coordination of a descriptor of the form (CATION) COMPOUNDS and the above anion descriptor.
Physical Radiation Effects
Radiation damage in ceramics: the influence of grain boundaries ($MgAl_2O_4$; YAG), 8:54258 (RA;US)

ALUMINIA
See ALUMINIUM OXIDES

ALUMINIUM
Fatigue
Effects of crack closure on ultrasonic transmission, 8:54537 (R;US)
Helium
Spectroscopic investigations of the physical state of helium in small bubbles in aluminium and nickel films, 8:54218 (R;DE;In German)
Information Systems
Materials information systems. Volume VI. Aluminum case study, 8:54237 (R;US)
Ion Implantation
In situ ion implantation of N^+ in aluminum, 8:54222 (RA;US)
Materials Recovery
Mineral recovery from coal-conversion solid wastes, 8:53387 (R;US)
Physical Radiation Effects
Effect of high-energy ion irradiation on aluminium creep (70 MeV carbon ion irradiation), 8:54217 (R;SU;In Russian)
In situ ion implantation of N^+ in aluminum, 8:54222 (RA;US)
Smelting
Sonic resonator control and method for determining component concentration in multiple-component liquid, 8:54772 (P;US)
Stopping Power
Ion stopping in heated targets, 8:55302 (R;US)
Thermal Conductivity
Analysis of thermal conductivity data for fourteen elements in normal and superconducting states. State-of-the-art report, 8:54206 (R;US)
Transition Temperature
Analysis of thermal conductivity data for fourteen elements in normal and superconducting states. State-of-the-art report, 8:54206 (R;US)

ALUMINIUM 27 TARGET
Argon 40 Reactions
Calculation of fusion cross sections, 8:55175 (R;DD;In German)
Neon 22 Reactions
Calculation of fusion cross sections, 8:55175 (R;DD;In German)
Nitrogen 14 Reactions
Calculation of fusion cross sections, 8:55175 (R;DD;In German)
Oxygen 16 Reactions
Calculation of fusion cross sections, 8:55175 (R;DD;In German)
Proton Reactions
Deuteron production in proton-nucleus interactions at 7.5 GeV/c, 8:55183 (R;SU;In Russian)

ALUMINIUM ALLOYS
See also ALUMINIUM BASE ALLOYS
Corrosion
Durability of marker materials for nuclear waste isolation sites, 8:53670 (R;US)
Physical Radiation Effects
Disordering under HVEM irradiation (Ni_3Al; Ni_3Fe; NiAl; FeAl), 8:54224 (RA;US)
Service Life
Durability of marker materials for nuclear waste isolation sites, 8:53670 (R;US)
Weathering
Durability of marker materials for nuclear waste isolation sites, 8:53670 (R;US)

ALUMINIUM BASE ALLOYS
Deformation
In situ deformation and fracture studies on precipitation-hardened aluminum alloys, 8:54233 (RA;US)

ALUMINIUM OXIDES
Catalytic Effects
Cooperative investigation by Auburn University and Cities Service Research and Development Company of combined coal and heavy-resid processing. Quarterly report, January 15, 1983-April 15, 1983, 8:53345 (R;US)
Failures
Role of microstructural inhomogeneities on high-temperature failure in ceramics, 8:54257 (R;US)
Physical Radiation Effects
Radiation damage in ceramics: the influence of grain boundaries, 8:54258 (RA;US)
Thermal Shock
Thermal-shock resistant alumina-metal cermet insulators, 8:54261 (J;US)

ALUMINUM
See ALUMINIUM

ALVEOLI (PULMONARY)
See LUNGS

AMEBA
See AMOEBA

AMERICIUM
Radiochemical Analysis
Rapid method for the determination of americium-curium, plutonium and thorium in biological and environmental samples, 8:54349 (J;GB)
Toxicity
Assessment of plutonium internal contamination in man, 8:55041 (R;XE)

AMERICIUM 241
Energy Levels
Analysis of americium and curium resonance parameters, 8:55196 (R;SU;In Russian)
Radioecological Concentration
Plutonium and americium export to the north-east Pacific Ocean by Columbia River runoff, 8:54954 (J;GB)
Radionuclide concentrations in vegetation at a solid radioactive waste-disposal area in southeastern Idaho, 8:54932 (J;US)

AMERICIUM 241 TARGET
Neutron Reactions
Analysis of americium and curium resonance parameters, 8:55196 (R;SU;In Russian)

AMERICIUM 243
Energy Levels
Analysis of americium and curium resonance parameters, 8:55196 (R;SU;In Russian)

AMERICIUM 243 TARGET
Neutron Reactions
Analysis of americium and curium resonance parameters, 8:55196 (R;SU;In Russian)

AMERICIUM COMPLEXES
Structural Chemical Analysis
Raman spectrometric studies of actinide(V) and -(VI) complexes in aqueous sodium carbonate solution and of solid sodium actinide(V) carbonate compounds, 8:54350 (J;US)

AMES LABORATORY RESEARCH REACTOR
See ALRR REACTOR

AMINES
See also DOPAMINE
MELAMINE
Chemical Reactions
Rate constants for the decay and reactions of the lowest electronically excited singlet state of molecular oxygen in solution, 8:54343 (J;US)
Hydrogenation
Ionic hydrogen bond. 3. Multiple NH^+...O and CH/sup δ/$^+$...O bonds. Complexes of ammonium ions with polyethers and crown ethers, 8:54322 (J;US)
Structural Chemical Analysis
Ionic hydrogen bond. 3. Multiple NH^+...O and CH/sup δ/$^+$...O bonds. Complexes of ammonium ions with polyethers and crown ethers, 8:54322 (J;US)

AMINO ACIDS
Organic acids containing both a basic amino group and an acidic carboxyl group.
See also METHIONINE
Chemical Reactions
Rate constants for the decay and reactions of the lowest electronically excited singlet state of molecular oxygen in solution, 8:54343 (J;US)
AMINO ALCOHOLS
See ALCOHOLS
AMINES
AMINO SUGARS
See AMINES
AMINOGLYCIDES
See AMINES
AMMONIA
Breakdown
Isotope dependence of the breakdown strength of gases, 8:55109 (R;US)
Solvent Extraction
Process for removal of ammonia and acid gases from contaminated waters, 8:54948 (P;US)
AMMONIUM DIURANATE
See AMMONIUM URANATES
AMMONIUM NITRATES
Uptake
Uptake of ^{15}N labelled urea and ammonium nitrate by 4-year old Douglas-fir grown in sand-peat mix, 8:54986 (RA;XA)
AMMONIUM PERCHLORATES
Combustion
Experimental study of deflagration to detonation transition case of ammonium perchlorate, 8:54800 (RA;US)
Detonations
Experimental study of deflagration to detonation transition case of ammonium perchlorate, 8:54800 (RA;US)
Sensitivity
Experimental study of deflagration to detonation transition case of ammonium perchlorate, 8:54800 (RA;US)
AMMONIUM URANATES
Skin Absorption
Effects of uranium compounds on skin. Final report for the period 1 July 1980 - 31 October 1982, 8:55043 (R;XA)
AMMONIUM URANYL CARBONATES
See AUC
AMOEBA
Mutants
Mutants of thermotaxis in Dictyostelium discoideum, 8:55067 (J;US)
Temperature Effects
Mutants of thermotaxis in Dictyostelium discoideum, 8:55067 (J;US)
AMPLIFIERS
See also MICROWAVE AMPLIFIERS
PARAMETRIC AMPLIFIERS
Design
Precision absolute-value amplifier for a precision voltmeter, 8:54773 (P;US)
ANALOG RESONANCES
See RESONANCE
ANALYSIS (STRUCTURAL CHEMICAL)
See STRUCTURAL CHEMICAL ANALYSIS
ANGIOGRAPHY
See BIOMEDICAL RADIOGRAPHY
ANGULAR VELOCITY
Measuring Methods
Development of turbodrill tachometer. Final report, 8:53430 (R;US)
ANHARMONIC OSCILLATORS
Perturbation Theory
Quantum-mechanical oscillator with an arbitrary anharmonicity 1/N expansion and perturbation theory, 8:55224 (R;SU)
Power Series
Quantum-mechanical oscillator with an arbitrary anharmonicity 1/N expansion and perturbation theory, 8:55224 (R;SU)
ANIMAL CELLS
Includes human cells.
See also CHO CELLS
Genetic Radiation Effects
Suppressive action of near-ultraviolet light on ouabain resistance induced by far-ultraviolet light in Chinese hamster cells, 8:55052 (J;NL)
Radiosensitivity
Impact of radiobiological considerations on epidemiological inferences of age-dependent radiosensitivity, 8:55038 (RA;US)
ANODES
Protective Coatings
Parasitic corrosion-resistant anode for use in metal/air or metal/O_2 cells, 8:54052 (P;US)
ANTENNAS
Antennas and waveguides for electron-cyclotron heating of plasmas, 8:55260 (R;US)
ANTHRACENE
Excitation
Photoelectron-photon coincidences in anthracene crystals, 8:54674 (R;FR)
ANTIHYPERONS
Particle Production
Hyperon production in nC interactions in the neutron beam with approximately 40 GeV/c momentum, 8:55139 (R;SU;In Russian)
ANTINEUTRINO-NUCLEON INTERACTIONS
Structure Functions
Invariant current algebra on the light cone and deep inelastic lepton-hadron scattering. 3. Neutrino reactions, 8:55148 (R;SU;In Russian)
ANTIPROTON BEAMS
Beam Bunching
Rates and time structure expected from $\sqrt{s}$ = 40 TeV colliders, 8:54592 (RA;US)
Beam Luminosity
Rates and time structure expected from $\sqrt{s}$ = 40 TeV colliders, 8:54592 (RA;US)
APPLICATORS (RADIOTHERAPY)
See RADIATION SOURCES
AQUACULTURE
Feasibility Studies
Aquaculture report 1976, 8:53839 (R;US)
Mathematical Models
Aquaculture techniques: a production forecasting model for aquaculture systems. Technical completion report, 8:53779 (R;US)
Wind Turbines
Overview of the wind-energy project at Kahuku Seafood Plantation, 8:54108 (RA;US)
AQUATIC ECOSYSTEMS
Biological Stress
Annotated bibliography on the biological effects of constructing channels, jetties, and other coastal structures. Miscellaneous report, 8:54939 (R;US)
Productivity
Pipeline haul-road investigations north of the Brooks Range, 8:54941 (R;US)
Radioecology
Ecological Research Division Marine Research Program, 8:54951 (R;US)
Radionuclide Kinetics
Ecological Research Division Marine Research Program, 8:54951 (R;US)
Radionuclide Migration
Ecological Research Division Marine Research Program, 8:54951 (R;US)
AQUICULTURE
See AQUACULTURE
AQUIFERS
Contamination
Hydrocarbon spills, their retention in the subsurface and propagation into shallow aquifers, 8:54943 (R;US)
Radionuclide Migration
Performance assessment of a shaft seals system in a HLW repository in the Gibson Dome area, 8:53673 (R;US)

ARCTIC REGIONS
Research Programs
Assessment of cold-climate environmental research priorities, 8:54062 (R;US)
ARGON
Electron Attachment
Electron-molecule interactions in gases and liquids: the electron-attachment process in gases and nonpolar liquids, 8:55110 (R;US)
Ion-Atom Collisions
Interference effects in the quasimolecularen K-radiation induced in collisions of hydrogen-like ions, 8:55105 (R;DE;In German)
ARGON 40 REACTIONS
Fusion Reactions
Calculation of fusion cross sections, 8:55175 (R;DD;In German)
Heavy Ion Reactions
Search for flow in the reaction Ar + Pb (0.8 GeV/u), 8:55194 (R;US)
ARIZONA
Water Rights
Price, socioeconomic, and climatic influences on residential water use in southern arizona. Completion report, October 1980-September 1981, 8:54068 (R;US)
AROMATIC ACIDS
See CARBOXYLIC ACIDS
AROMATIC COMPOUNDS
See AROMATICS
AROMATICS
See also BENZENE
BENZYL ALCOHOL
DDT
PHENOLS
POLYCYCLIC AROMATIC HYDROCARBONS
Chemical Reactions
Rate constants for the decay and reactions of the lowest electronically excited singlet state of molecular oxygen in solution, 8:54343 (J;US)
Regiospecific and stereospecific reactions of $Ph_3C^+ PF_6^-$ with rhenium alkyls (eta-C_5H_5)Re(NO)(PPh_3)(R). α- vs β-hydride abstraction, 8:54323 (J;US)
Gas Chromatography
Kinds and quantities of organic combustion products in solid and liquid wastes from a coal-fired power station, 8:53393 (R;US)
Liquid Column Chromatography
System for analyzing coal-liquefaction products, 8:53382 (P;US)
Mass Spectroscopy
Kinds and quantities of organic combustion products in solid and liquid wastes from a coal-fired power station, 8:53393 (R;US)
NMR Spectra
Carbon-13 magnetic resonance of hydroaromatics. 2. Conformation of tetralin and tetrahydroanthracene and their methyl derivatives, 8:54327 (J;US)
Cross polarization and magic angle sample spinning NMR spectra of model organic compounds. 1. Highly protonated molecules, 8:54334 (J;US)
Spin-Lattice Relaxation
Cross polarization and magic angle sample spinning NMR spectra of model organic compounds. 1. Highly protonated molecules, 8:54334 (J;US)
ARSENIC
Activation Analysis
Elemental composition of human and animal milk. A review. A report prepared under the auspices of the IAEA in collaboration with the WHO, 8:54983 (R;XA)
ASHES
See also FLY ASH
Chemical Analysis
Trace element and radionuclide mass balances at a coal-fired electric generating station, 8:54888 (J;GB)
Monitoring
Ash level meter for a fixed-bed coal gasifier, 8:53362 (P;US)
Thermal Conductivity
Thermal and radiative properties of coal-ash deposits. Technical progress report No. 7, June 1, 1983-August 31, 1983, 8:53370 (R;US)
Thermal Radiation
Thermal and radiative properties of coal-ash deposits. Technical progress report No. 7, June 1, 1983-August 31, 1983, 8:53370 (R;US)
ASPHALTS
Decontamination
Weathering and decontamination of radioactivity deposited on asphalt surfaces, 8:54345 (R;DK)
ATF TORSATRON
ECR Heating
ATF-1 program objectives, 8:55271 (RA;US)
ATMOSPHERIC PRECIPITATIONS
See also RAIN
Atmospheric Chemistry
Effects of varying air trajectories on spatial and temporal precipitation chemistry patterns, 8:54895 (J;NL)
Radionuclide Migration
Levels of strontium 90 in the environment at PINSTECH (Period 1979-1980), 8:54927 (R;PK)
ATOM-ATOM COLLISIONS
Differential Cross Sections
Thermal-energy scattering of atoms in high Rydberg states. Final report, 8:55113 (R;US)
ATOMIC ENERGY
See NUCLEAR ENERGY
ATOMIC ENERGY RESEARCH ESTABLISHMENT
See AERE
ATOMIC EXPLOSIONS
See NUCLEAR EXPLOSIONS
ATOM-MOLECULE COLLISIONS
Differential Cross Sections
Thermal-energy scattering of atoms in high Rydberg states. Final report, 8:55113 (R;US)
AUC
Skin Absorption
Effects of uranium compounds on skin. Final report for the period 1 July 1980 - 31 October 1982, 8:55043 (R;XA)
AUSTENITIC STEELS
Prior to February, 1978 STEELS and AUSTENITE were used to index this concept.
Mechanical Properties
Influence of alloy composition on the cryogenic mechanical properties of AISI 200 grade high-manganese austenitic steels, 8:54219 (R;US)
AUSTRALIA
See also WESTERN AUSTRALIA
Coal Industry
Metallurgical coal in the 1980's - facts and prospects, 8:53423 (R;US)
Environmental Policy
Environmental radiation monitoring, 8:54896 (RA;AU)
Radioactivity
Environmental radiation monitoring, 8:54896 (RA;AU)
Natural radioactivity in the production of titanium dioxide pigment: a study of the Laporte plant and environmental behaviour of radionuclides at Bunbury, Western Australia, 8:54921 (RA;AU)
AUSTRIA
Government Policies
Concept for supplying Austria with mineral raw- and primary material, 8:54066 (R;AT;In German)
Minerals
Concept for supplying Austria with mineral raw- and primary material, 8:54066 (R;AT;In German)
Raw Materials
Concept for supplying Austria with mineral raw- and primary material, 8:54066 (R;AT;In German)
Resource Assessment
Use and resources of mineral raw material, statistical data on the raw material supply of Austria, 8:54064 (R;AT;In German)

AUTOCLAVES
Fischer-Tropsch Synthesis
Stirred autoclave apparatus for study of the Fischer-Tropsch synthesis in a slurry bed. 2. Analytical procedures, 8:54316 (J;US)
AUTOMOBILE EFFICIENCY STANDARDS
See AUTOMOBILES STANDARDS
AUTOMOBILES
Air Conditioners
EPA (Environmental Protection Agency) evaluation of the P.A.S.S. kit device under Section 511 of the Motor Vehicle Information and Cost Savings Act. Technical report, 8:54201 (R;US)
Energy Conservation
Technical review, volume 19, number 3, serial number 55, October 1982 (Mitsubishi Heavy Industries), 8:54168 (R;US)
Load Management
EPA (Environmental Protection Agency) evaluation of the P.A.S.S. kit device under Section 511 of the Motor Vehicle Information and Cost Savings Act. Technical report, 8:54201 (R;US)
AUTORADIOGRAPHS
See IMAGES
AUTORADIOGRAPHY
Uses
Quantitative autoradiography with radiopharmaceuticals, Part 2: Applications in radiopharmaceutical research: concise communication, 8:54969 (J;US)
AUXILIARY WATER SYSTEMS
Biological Fouling
Engineering factors influencing Corbicula fouling in nuclear-service water systems, 8:53869 (R;US)
AVR REACTOR
Reactor Instrumentation
AVR-pebble-bed reactor: Core-physics control without incore-instrumentation, 8:53887 (R;XA)
AWAY-FROM-REACTOR STORAGE
Status of dry storage of irradiated fuel in Canada, 8:53595 (BA;XN)
Spent Fuel Casks
Long-term dry storage demonstration with spent LWR fuel, 8:53583 (BA;XN)
AZIDES
For inorganic compounds only. For organic azides, use AZIDO COMPOUNDS.
Detonations
Low energy laser initiation of single crystals of β-lead azide, 8:54841 (RA;US)

B

B-1235 RESONANCES
Weak Particle Decay
Tau and B lifetime measurements from the MARK II, 8:55142 (R;US)
BACKFILLING
Leaching
Review of waste package verification tests. Semiannual report, October 1982-March 1983, 8:53653 (R;US)
Performance Testing
Review of waste package verification tests. Semiannual report, October 1982-March 1983, 8:53653 (R;US)
BACKGROUND RADIATION
Radiation Monitoring
Measurement of environmental radioactivity in Toki district, 8:54690 (R;JP;In Japanese)
BACON
See MEAT
BACTERIA
See also METHANOGENIC BACTERIA
Ethanol production by Zymomonas mobilis, 8:53741 (R;US)
Lethal Irradiation
Bactericidal effect of ultraviolet irradiation, 8:55045 (RA;FR;In French)
BAGASSE
Power Generation
Biomass-energy development in the sugar industry, 8:53765 (RA;US)
BALANCE (ENERGY)
See ENERGY BALANCE
BANKS
See COMMERCIAL BUILDINGS
BARC
Research Programs
Research within the coordinated programme on neutron scattering techniques in applied research. Final report for the period 1 October 1978 - 31 December 1981, 8:55202 (R;XA)
BARIUM FLUORIDES
Physical Radiation Effects
Damage ingrowth and recovery in alpha-irradiated CaF_2, SrF_2, and BaF_2, 8:54282 (J;GB)
BARYON NUMBER
Theoretical perspective for baryon number violation, 8:55144 (RA;US)
BATHYMETRY
Remote Sensing
Bathymetry of Alaskan arctic lakes: a key to resource inventory with remote-sensing methods, 8:54933 (R;US)
BATTERIES (ELECTRIC)
See ELECTRIC BATTERIES
BEAM DUMPS
Specifications
SLAC 200-kW Copper Sphere Beam Dump (100 kW actual): SA-901-061-01-R2 Subassembly; CK-082-783-00-R0 Auxiliary Drawing List (Engineering Materials), 8:54601 (E;US)
BEAM EXTRACTION
Phase Diagrams
Characteristic time structure in slow resonant extracted beam, 8:54621 (R;US)
BEAM MONITORS
Calibration
Relativistic-beam Pickup Test Facility, 8:54574 (R;US)
Plastic Scintillation Detectors
Plastic scintillation monitor for methodical investigation of track detectors on the JINR synchrophasotron, 8:54585 (R;SU;In Russian)
Preamplifiers
Low-noise gallium-arsenide field-effect transistor preamplifiers for stochastic beam-cooling systems, 8:54619 (R;US)
BEAM SEPARATORS
For velocity separation of secondary beams.
Cryogenic Bubble Chambers
Particle dosing for a bubble chamber in the microsecond time range of beam extraction, 8:54684 (R;SU;In Russian)
BEAM-PLASMA SYSTEMS
Sausage Instability
Stabilizing effect of gas conductivity evolution on the resistive sausage mode of a propagating beam. Memorandum report, 8:55234 (R;US)
BEAUFORT SEA
Natural Gas Deposits
Diapir Field lease offering, June 1984, 8:53440 (R;US)
Petroleum Deposits
Diapir Field lease offering, June 1984, 8:53440 (R;US)
Water Currents
Surface drifter study - Beaufort Sea, Alaska. Final report, 8:53437 (R;US)
BEAUTY PARTICLES
Weak Hadronic Decay
New particles and decays, 8:55131 (RA;XC)
BEEF
See MEAT
BELLOWS
Design
Rolling-cuff flexible bellows, 8:54482 (P;US)

BELT CONVEYORS
Design
Laterally bendable belt conveyor, 8:54484 (P;US)
BENTONITE
Leaching
Review of DOE waste package program. Subtask 1.1. National waste package program, October 1982-March 1983. Vol. 4, 8:53652 (R;US)
Radiolysis
Review of DOE waste package program. Subtask 1.1. National waste package program, October 1982-March 1983. Vol. 4, 8:53652 (R;US)
BENZALDEHYDE
Chemical Reactions
Bimetallic anionic formyl complexes: synthesis and properties, 8:54331 (J;US)
BENZENE
Catalytic Cracking
Experimental studies on the control of hydrocarbons emission from a gasifier. Final report, September 1981-February 1983, 8:53337 (R;US)
Excitation
Activation of C-H bonds in saturated hydrocarbons on photolysis of (eta^5-C_5Me_5)(PMe_3)IrH_2. Relative rates of reaction of the intermediate with different types of C-H bonds and functionalization of the metal-bound alkyl groups, 8:54326 (J;US)
NMR Spectra
Activation of C-H bonds in saturated hydrocarbons on photolysis of (eta^5-C_5Me_5)(PMe_3)IrH_2. Relative rates of reaction of the intermediate with different types of C-H bonds and functionalization of the metal-bound alkyl groups, 8:54326 (J;US)
Removal
Experimental studies on the control of hydrocarbons emission from a gasifier. Final report, September 1981-February 1983, 8:53337 (R;US)
BENZOIC ALDEHYDE
See BENZALDEHYDE
BENZYL ALCOHOL
Chemical Reaction Yield
Bimetallic anionic formyl complexes: synthesis and properties, 8:54331 (J;US)
BER-2 REACTOR
Reactor Instrumentation
Workshop on instrumentation of the disassembled BER II, 8:53983 (R;DE;In German)
BERKELEY BEVALAC
See BEVALAC
BERLIN-2 RESEARCH REACTOR
See BER-2 REACTOR
BERYLLIUM
Ion Implantation
Retention and thermal release of deuterium implanted in beryllium, 8:55303 (R;US)
BERYLLIUM 9 REACTIONS
Fusion Reactions
Fusion of heavy ions in an interaction potential model, 8:55168 (R;PL;In Polish)
BERYLLIUM 9 TARGET
Proton Reactions
Deuteron production in proton-nucleus interactions at 7.5 GeV/c, 8:55183 (R;SU;In Russian)
BERYLLIUM MODERATORS
See BERYLLIUM
BETA BEAMS (ELECTRONS)
See ELECTRON BEAMS
BETA BEAMS (POSITRONS)
See POSITRON BEAMS
BETA DECAY
For neutron and nuclear decay.
Lepton Number
Lepton nonconservation and double beta decay, 8:55125 (RA;US)
BETA DOSIMETRY
Si Semiconductor Detectors
β rays dosimetry with stack type detectors in β and γ rays mixed fields, 8:54733 (R;JP;In Japanese)
BETA PARTICLES
Emitted by nuclei.
Specifications
Specification for symbol for ionizing radiation, 8:55211 (R;MY)
BETA RATIO
Reviews
Review of the beta situation, 8:55236 (R;US)
BETATRON OSCILLATIONS
Resonance
Improvement of radiative polarization in plane storage rings, 8:54591 (R;JP)
BETATRONS
Beam Dynamics
Beam breakup instabilities in high current electron beam racetrack induction accelerators, 8:54573 (R;US)
Drag instability in the modified betatron. Memorandum report, 8:54571 (R;US)
Mode coupling in the modified betatron. Memorandum report, 8:54568 (R;US)
Beam Injection
High current betatron stability and injection studies, 8:54572 (R;US)
Kilo Amp Beam Currents
Beam breakup instabilities in high current electron beam racetrack induction accelerators, 8:54573 (R;US)
BEVALAC
Beam Extraction
Characteristic time structure in slow resonant extracted beam, 8:54621 (R;US)
BEZNAU-1 REACTOR
Reactor Decommissioning
Decommissioning study for the Beznau nuclear power plant (2 x 350 MW): the Swiss approach, 8:54011 (RA;US)
Reactor Dismantling
Decommissioning study for the Beznau nuclear power plant (2 x 350 MW): the Swiss approach, 8:54011 (RA;US)
BHABHA ATOMIC RESEARCH CENTER
See BARC
BI-GAS PROCESS
Monitoring
Engineering-support services for the DOE/GRI coal-gasification research program. Monthly technical progress report, 27 February-26 March 1982, 8:53335 (R;US)
Pilot Plants
Engineering-support services for the DOE/GRI coal-gasification research program. Monthly technical progress report, 27 February-26 March 1982, 8:53335 (R;US)
BINARY ALLOY SYSTEMS
Diffusion
Computer simulation of the vacancy-wind effect in a concentrated alloy with long- and short-range order, 8:54250 (J;GB)
Solidification
Shortcoming of the explicit solution for the binary alloy solidification problem, 8:54248 (J;US)
BIOGAS
See METHANE
BIOLOGICAL MATERIALS
Chemical Analysis
Development of an analytical technique for the determination of traces of mercury by substoichiometric isotope dilution method, 8:54296 (R;TH)
Classification
Optically active biological particle-distinguishing apparatus, 8:54918 (P;US)
Particle Size Classifiers
Optically active biological particle-distinguishing apparatus, 8:54918 (P;US)
BIOLOGICAL REACTORS
See BIOREACTORS
BIOLOGICAL SHIELDS
Activity Levels
Neutron activation of reactor pressure vessel and biological shield of the decommissioned Gundremmingen Unit A Nuclear Power Station, 8:54001 (RA;US)

BIOMASS
Governor's energy conference - Hawaii's energy options for the 80s, 8:54053 (R;US)
Gasification
Technical and economic assessment of liquid-fuel production from biomass. Final research report, 8:53774 (R;US)
Liquefaction
Technical and economic assessment of liquid-fuel production from biomass. Final research report, 8:53774 (R;US)
Liquid Fuels
Liquid-fuel research in Hawaii, 8:53768 (RA;US)
Production
Woody biomass production through solar energy conversion. Annual report, 1980-1981, 8:53773 (R;US)
BIOMASS CONVERSION PLANTS
Use only for plants converting biomass to fuel, do NOT use for plants preparing wastes and biomass for combustion.
Design
Technical and economic assessment of liquid-fuel production from biomass. Final research report, 8:53774 (R;US)
Economic Analysis
Technical and economic assessment of liquid-fuel production from biomass. Final research report, 8:53774 (R;US)
Performance
Molokai Biomass Project, 8:53767 (RA;US)
Pilot Plants
Integrated liquid-fuel production, 8:53769 (RA;US)
BIOMASS PLANTATIONS
Demonstration Programs
Eucalyptus plantations for energy production in Hawaii, 8:53766 (RA;US)
Locusts
Application of sugar maple and black locust to the biomass/energy-plantation concept. Annual report, March 1, 1981-February 28, 1982, 8:53772 (R;US)
Maples
Application of sugar maple and black locust to the biomass/energy-plantation concept. Annual report, March 1, 1981-February 28, 1982, 8:53772 (R;US)
BIOMEDICAL RADIOGRAPHY
See also INDUSTRIAL RADIOGRAPHY.
Performance
Radiography system enabling clear images to be obtained with an X ray dose less than 1/10th of that employed in conventional radiography, 8:54978 (TG;FR;In French)
Proton Beams
Proton nuclear scattering radiography, 8:54971 (R;FR)
Radiation Doses
Examination of the distribution of patient doses from diagnostic x-ray procedures, 8:55002 (R;AU)
Occupational radiation exposures in Canada - 1979, 8:55040 (R;CA;In English, French)
BIOREACTORS
Prior to March 1983 this concept was indexed to CHEMICAL REACTORS.
Design
Ethanol production by Zymomonas mobilis, 8:53741 (R;US)
BITTER SPAR
See DOLOMITE
BITUMENS
See also ASPHALTS
Resources
Toward an estimate of world heavy crude oil and tar sands resources, 8:53449 (RA;US)
Solvent Extraction
Tarco semi-commercial solvent extraction of tar sands, 8:53456 (RA;US)
BITUMINOUS COAL
Dissolution
Macromolecular structural changes in bituminous coals during extraction and solubilizatio. Final technical report, September 1, 1980-August 31, 1983, 8:53369 (R;US)
Molecular Structure
Macromolecular structural changes in bituminous coals during extraction and solubilizatio. Final technical report, September 1, 1980-August 31, 1983, 8:53369 (R;US)
Structural Chemical Analysis
Macromolecular structural changes in bituminous coals during extraction and solubilizatio. Final technical report, September 1, 1980-August 31, 1983, 8:53369 (R;US)
Swelling
Macromolecular structural changes in bituminous coals during extraction and solubilizatio. Final technical report, September 1, 1980-August 31, 1983, 8:53369 (R;US)
BLACK LUNG DISEASE
See PNEUMOCONIOSES
BLASTING
See EXPLOSIVE FRACTURING
BLASTS
See EXPLOSIONS
BLENDERS
See MIXERS
BLOOD CELLS
See also LEUKOCYTES
Biological Radiation Effects
Cell labeling: radiation dose and effects, 8:55047 (J;US)
BLUE-GREEN ALGAE
See CYANOBACTERIA
BN-350 REACTOR
Acoustic Monitoring
Acoustic control system BN-350. Explanatory note, 8:53951 (TG;FR;In French)
Boiling Detection
Acoustic control system BN-350. Explanatory note, 8:53951 (TG;FR;In French)
BNL
Tandem Electrostatic Accelerators
Brookhaven Double MP Facility - recent developments and plans for the future, 8:54596 (R;US)
BODY BURDEN
Calculation Methods
Body burden estimation of ^{32}P by measurement and calibration of bremsstrahlung radiation produced in the skull, 8:55050 (J;GB)
BOILER FUEL
See BOILER FUELS
BOILER FUELS
Agricultural Wastes
Technical and economic feasibility of utilizing apple pomace as a boiler feedstock, 8:53746 (R;US)
BOILERS
See also REFUSE-FUELED BOILERS
Availability
Examining relationships between coal characteristics and the performance of TVA power plants. Final report, 8:53861 (R;US)
Capacity
Examining relationships between coal characteristics and the performance of TVA power plants. Final report, 8:53861 (R;US)
Chemical Composition
Examining relationships between coal characteristics and the performance of TVA power plants. Final report, 8:53861 (R;US)
Control Systems
Boiler control systems oxygen trim systems manual. Final report fy 82, 8:54156 (R;US)
Economic Analysis
Supplement to: March 1982 consumer products efficiency standards, engineering analysis and economic analysis documents, 8:54135 (R;US)
Efficiency
Examining relationships between coal characteristics and the performance of TVA power plants. Final report, 8:53861 (R;US)
Supplement to: March 1982 consumer products efficiency standards, engineering analysis and economic analysis documents, 8:54135 (R;US)
Fuel Substitution
Technical and economic feasibility of utilizing apple pomace as a boiler feedstock, 8:53746 (R;US)

Maintenance
Examining relationships between coal characteristics and the performance of TVA power plants. Final report, 8:53861 (R;US)
Operating Cost
Examining relationships between coal characteristics and the performance of TVA power plants. Final report, 8:53861 (R;US)
Performance
Effect of fuel gas composition on appliance performance. Topical report Jul 78-Dec 82, 8:53447 (R;US)
Standards
Supplement to: March 1982 consumer products efficiency standards, engineering analysis and economic analysis documents, 8:54135 (R;US)
Welded Joints
Austenitic stainless steel-ferritic steel weld joint failures, 8:54245 (J;US)
BOILING DETECTION
Acoustic Monitoring
Simulation study of neutronic and acoustic methods of boiling detection, 8:53948 (R;JP)
Transmission experiment by the simulated LMFBR model and propagation analysis of acoustic signals, 8:53947 (R;JP)
Neutron Spectroscopy
Simulation study of neutronic and acoustic methods of boiling detection, 8:53948 (R;JP)
BOILING WATER COOLED AND MODERATED REACTO
See BWR TYPE REACTORS
BONE DISEASES
See SKELETAL DISEASES
BONE MARROW
Dose Equivalents
Evaluation of the radiation doses to uranium mine employees exposed to external gamma radiation, 8:54999 (R;AU)
BONES
See SKELETON
BOOKKEEPING
See ACCOUNTING
BOOSTERS (PARTICLE)
See PARTICLE BOOSTERS
BOR-60 REACTOR
Data Acquisition Systems
Software for the PROFILE subsystem in the radiation material testing research system for mass measurements of irradiated fuel element geometric dimensions, 8:53967 (R;SU;In Russian)
On-Line Measurement Systems
Software for the PROFILE subsystem in the radiation material testing research system for mass measurements of irradiated fuel element geometric dimensions, 8:53967 (R;SU;In Russian)
BOREHOLES
Plugging
Rock mass sealing: experimental assessment of borehole plug performance. Annual report, June 1982-May 1983, 8:53657 (R;US)
BORON
Ecological Concentration
Determination of baseline levels of toxic nonradioactive substances at the ICPP, 8:53648 (R;US)
BORON ALLOYS
Recrystallization
Moessbauer spectroscopy study of amorphous $Fe_{87}B_{11}Au_2$ ribbon and its crystallization products, 8:54216 (R;US)
BORON PHOSPHIDES
Deposition
Free-standing polycrystalline boron phosphide film and method for production thereof, 8:54285 (P;US)
BOROSILICATE GLASS
See also PYREX
Corrosion
Review of DOE waste package program. Subtask 1.1. National waste package program, October 1982-March 1983. Vol. 4, 8:53652 (R;US)
Leaching
Review of DOE waste package program. Subtask 1.1. National waste package program, October 1982-March 1983. Vol. 4, 8:53652 (R;US)
Performance Testing
Review of waste package verification tests. Semiannual report, October 1982-March 1983, 8:53653 (R;US)
BOROSILICATES
See BOROSILICATE GLASS
BOSON-EXCHANGE MODELS
Hamiltonians
Meson-exchange Hamiltonian for NN scattering and isobar-nucleus dynamics, 8:55145 (R;US)
BRACKISH WATER ECOSYSTEMS
See AQUATIC ECOSYSTEMS
BRAKES
Design
Braking system, 8:54485 (P;US)
BRAKING RADIATION
See BREMSSTRAHLUNG
BRAUNSCHWEIG EXPERIMENTAL REACTOR
See FMRB REACTOR
BRAUNSCHWEIG RESEARCH REACTOR
See FMRB REACTOR
BREAKWATERS
See DAMS
BREASTS
See MAMMARY GLANDS
BREMSSTRAHLUNG
Radiation Detectors
Detector for use in high energy bremsstrahlung shielding studies, 8:54660 (RA;AU)
BRIQUETS
Gasification
Gasification of Simplex briquets: demonstration in the General Electric high-pressure gasifier. Vol.2. Final report, 8:53347 (R;US)
BRIQUETTING
Recommendations
Gasification of Simplex briquets: briquet production. Vol.1. Final report, 8:53346 (R;US)
BROMINATED ALIPHATIC HYDROCARBONS
Photochemical Reactions
Photochemical cycloadditions of 2,3-dihalobenzo[b]thiophenes: stereochemical and mechanistic results, 8:53740 (J;US)
BROMINATED AROMATIC HYDROCARBONS
Photochemical Reactions
Photochemical cycloadditions of 2,3-dihalobenzo[b]thiophenes: stereochemical and mechanistic results, 8:53740 (J;US)
Structural Chemical Analysis
Regiospecific incorporation of bromine and iodine into phenols using (trimethylsilyl)phenol derivatives, 8:54333 (J;US)
Synthesis
Regiospecific incorporation of bromine and iodine into phenols using (trimethylsilyl)phenol derivatives, 8:54333 (J;US)
BROMINE
Chemical Reactions
Regiospecific incorporation of bromine and iodine into phenols using (trimethylsilyl)phenol derivatives, 8:54333 (J;US)
BROMINE 77
Isotopic Exchange
Regiospecific incorporation of bromine and iodine into phenols using (trimethylsilyl)phenol derivatives, 8:54333 (J;US)
BROMINE 81 TARGET
Neutron Reactions
Parity nonconservation in neutron resonances (0.88 eV ^{81}Br, 4.53 eV ^{111}Cd, 1.33 eV ^{117}Sn, 0.75 eV ^{139}La neutron resonances), 8:55180 (R;SU;In Russian)
BROMINE 82
Isotopic Exchange
Regiospecific incorporation of bromine and iodine into phenols using (trimethylsilyl)phenol derivatives, 8:54333 (J;US)
BROMINE BROMIDES
See BROMINE
BRONCHOGENIC CARCINOMA
See CARCINOMAS

BROOKHAVEN AGS
Accelerator Facilities
Neutrino-oscillation experiments at Brookhaven National Laboratory, 8:55127 (R;US)
Beam Injection
AGS polarized proton project, 8:54597 (R;US)
Polarized Beams
AGS polarized proton project, 8:54597 (R;US)
BROOKHAVEN INTERSECTING STORAGE ACCELERAT
See ISABELLE STORAGE RINGS
BROOKHAVEN NATIONAL LABORATORY
See BNL
BROWNS FERRY-1 REACTOR
After-Heat Removal
Effect of small-capacity, high-pressure injection systems on TQUV sequences at Browns Ferry Unit One, 8:54029 (R;US)
Engineered Safety Systems
Effect of small-capacity, high-pressure injection systems on TQUV sequences at Browns Ferry Unit One, 8:54029 (R;US)
Reactor Accidents
Effect of small-capacity, high-pressure injection systems on TQUV sequences at Browns Ferry Unit One, 8:54029 (R;US)
BTU METERS
See HEAT METERS
BUCKLING (STRUCTURAL)
See DEFORMATION
BUILDING CODES
Surveys
Equivalency methodology: issues, findings, and recommendations, 8:54137 (R;US)
BUILDING MATERIALS
See also CEMENTS
CONCRETES
Physical Radiation Effects
Compilation of radiation damage test data. Pt. 3. Materials used around high-energy accelerators, 8:54272 (R;XC;In English, French)
Radioactivity
Cancer incidence study in Mesa County, Colorado, 8:55036 (RA;US)
Epidemiology applied to health physics, 8:55003 (R;US)
Storage Facilities
Storage sites of solid mineral raw materials in Austria and their importance, 8:54063 (R;AT;In German)
BUILDINGS
See also COMMERCIAL BUILDINGS
DOUBLE ENVELOPE BUILDINGS
GREENHOUSES
HOSPITALS
OFFICE BUILDINGS
PUBLIC BUILDINGS
RESIDENTIAL BUILDINGS
SCHOOL BUILDINGS
Computerized Simulation
Energy balance of buildings, 8:54140 (R;DE;In German)
Convection
Convective heat transfer in buildings: recent research results. Rev., 8:54139 (R;US)
Energy Balance
Energy balance of buildings, 8:54140 (R;DE;In German)
Energy Conservation
Conservation of energy resources, 8:54147 (B;US)
How to organize an energy-conservation program for new and existing buildings, 8:54133 (RA;US)
Energy Consumption
Large climate-moderating envelopes for enclosed structures. A preliminary evaluation of energy-conservation potential, 8:54138 (R;US)
Heat Transfer
Convective heat transfer in buildings: recent research results. Rev., 8:54139 (R;US)
Mathematical Models
Energy balance of buildings, 8:54140 (R;DE;In German)
BUILDINGS (CONTAINMENT)
See CONTAINMENT BUILDINGS
BUREAU OF MINES
See US BUREAU OF MINES
BURNERS
Design
Development of a flaring burner disposal system. Final report, 8:53438 (R;US)
Performance
Effect of fuel gas composition on appliance performance. Topical report Jul 78-Dec 82, 8:53447 (R;US)
BURST CAN DETECTION
See FAILED ELEMENT DETECTION
BURST CAN MONITORS
See FAILED ELEMENT MONITORS
BURST SLUG DETECTION
See FAILED ELEMENT DETECTION
BURST SLUG MONITORS
See FAILED ELEMENT MONITORS
BUSHINGS
Design
High-voltage R-F feedthrough bushing (Patent), 8:55322 (P;US)
BUTADIENE
Chemical Reaction Yield
Solid-state, surface, and catalytic properties of oxides. Progress report, October 1, 1982-August 31, 1983, 8:54306 (R;US)
BUTANE
Combustion Products
Study of factors affecting soot formation in a swirl-stabilized combustor. Final report 22 Jan 80-30 Sep 82, 8:53443 (R;US)
BUTANOLS
Chemical Feedstocks
Integrated liquid-fuel production, 8:53769 (RA;US)
BUTENES
Combustion Products
Study of factors affecting soot formation in a swirl-stabilized combustor. Final report 22 Jan 80-30 Sep 82, 8:53443 (R;US)
Dehydrogenation
Solid-state, surface, and catalytic properties of oxides. Progress report, October 1, 1982-August 31, 1983, 8:54306 (R;US)
BUTYL ALCOHOLS
See BUTANOLS
BUTYLENES
See BUTENES
BUTYRIC ALCOHOLS
See BUTANOLS
BWR TYPE REACTORS
See also BROWNS FERRY-1 REACTOR
GUNDREMMINGEN-2 REACTOR
HDR REACTOR
IPDR REACTOR
LACBWR REACTOR
LINGEN REACTOR
PATHFINDER REACTOR
PEACH BOTTOM-2 REACTOR
PEACH BOTTOM-3 REACTOR
SHOREHAM REACTOR
Auxiliary Water Systems
Engineering factors influencing Corbicula fouling in nuclear-service water systems, 8:53869 (R;US)
Containment Buildings
Application of the TEMPEST computer code for simulating hydrogen distribution in model containment structures, 8:54035 (R;US)
Potential for containment leak paths through electrical penetration assemblies under severe accident conditions, 8:54030 (R;US)
Containment Systems
Detonation of hydrogen-air mixtures, 8:54036 (R;US)
Control Elements
Experience in BWR control rod shipping, 8:53893 (RA;US)
Control Rooms
Task analysis of nuclear-power-plant control-room crews: project approach methodology, 8:53944 (R;US)
Loss of Coolant
Application of the TEMPEST computer code for simulating hydrogen distribution in model containment structures, 8:54035 (R;US)

Meltdown
Model for superheated debris-bed quench for severe-accident containment calculations, 8:53986 (R;US)
Radioactive Effluents
Population dose commitments due to radioactive releases from nuclear power plant sites in 1980, 8:53952 (R;US)
Reactor Accidents
Detonation of hydrogen-air mixtures, 8:54036 (R;US)
Potential for containment leak paths through electrical penetration assemblies under severe accident conditions, 8:54030 (R;US)
Reactor Components
Logical framework for identifying equipment important to safety in nuclear power plants, 8:54028 (R;US)
Reactor Decommissioning
Experience in treatment of components, waste treatment, packaging and shipping related to decommissioning, 8:53935 (RA;US)
Reactor Dismantling
Experience in treatment of components, waste treatment, packaging and shipping related to decommissioning, 8:53935 (RA;US)
Reactor Licensing
Regulatory licensing status summary report. Volume 12, No. 8. Nuclear power plants data for decisions (blue book), August 1-August 31, 1983, 8:53908 (R;US)
Reactor Materials
Hydrogen-generating reactions in LWR severe accidents, 8:54019 (R;US)
Reactor Operators
Task analysis of nuclear-power-plant control-room crews: project approach methodology, 8:53944 (R;US)
Task analysis of nuclear-power-plant control-room crews, 8:53945 (R;US)
Reactor Safety
Advanced reactor safety research. Quarterly report, October-December 1981. Volume 20, 8:54027 (R;US)
Spent Fuel Elements
Experience with fuel damage caused by abnormal conditions in handling and transport, 8:53868 (RA;US)
Thermodynamic Cycles
Nuclear power plants: structure and function, 8:53867 (R;US)

C

CABLES (ELECTRIC)
See ELECTRIC CABLES
CADMIUM
Absorption Spectroscopy
Development of preconcentration techniques for the determination of cadmium, copper, lead and zinc in sea water in conjunction with flame atomic absorption spectrophotometry, 8:54298 (R;TH)
Activation Analysis
Elemental composition of human and animal milk. A review. A report prepared under the auspices of the IAEA in collaboration with the WHO, 8:54983 (R;XA)
Ecological Concentration
Determination of baseline levels of toxic nonradioactive substances at the ICPP, 8:53648 (R;US)
Incidence of heavy metals in street surface sediments: solubility and grain size studies, 8:54917 (J;NL)
Trace metals in tropical river environment--distribution, 8:54945 (J;NL)
Trace metals in tropical river environment--speciation and biological transfer, 8:54946 (J;NL)
Isotope Dilution
Development of an analytical technique for the determination of traces of cadmium by substoichiometric isotope dilution technique, 8:54297 (R;TH;In Thai)
Proton Reactions
Deuteron production in proton-nucleus interactions at 7.5 GeV/c, 8:55183 (R;SU;In Russian)
Solvent Extraction
Development of an analytical technique for the determination of traces of cadmium by substoichiometric isotope dilution technique, 8:54297 (R;TH;In Thai)
Spectrophotometry
Development of preconcentration techniques for the determination of cadmium, copper, lead and zinc in sea water in conjunction with flame atomic absorption spectrophotometry, 8:54298 (R;TH)
Thermal Conductivity
Analysis of thermal conductivity data for fourteen elements in normal and superconducting states. State-of-the-art report, 8:54206 (R;US)
Transition Temperature
Analysis of thermal conductivity data for fourteen elements in normal and superconducting states. State-of-the-art report, 8:54206 (R;US)
CADMIUM 111 TARGET
Neutron Reactions
Parity nonconservation in neutron resonances (0.88 eV ^{81}Br, 4.53 eV ^{111}Cd, 1.33 eV ^{117}Sn, 0.75 eV ^{139}La neutron resonances), 8:55180 (R;SU;In Russian)
CADMIUM SULFIDE SOLAR CELLS
Mathematical Models
Junction geometry in Cu_2S/CdS or Cu_2S/Cdsub(1-x)Znsub(x)S solar cells prepared by the solution reaction method, 8:53785 (J;CH)
P-N Junctions
Junction geometry in Cu_2S/CdS or Cu_2S/Cdsub(1-x)Znsub(x)S solar cells prepared by the solution reaction method, 8:53785 (J;CH)
CADMIUM TELLURIDES
Microstructure
High voltage high resolution electron microscopy of compound semiconductors, 8:54278 (RA;US)
CAES PLANT
See COMPRESSED AIR STORAGE POWER PLANTS
CALCIUM
Activation Analysis
Elemental composition of human and animal milk. A review. A report prepared under the auspices of the IAEA in collaboration with the WHO, 8:54983 (R;XA)
Metabolism
Studies of the calcium metabolism of subjects with renal dysfunction, 8:54965 (RA;AU)
Thermal Diffusion
Thermodiffusional transport in pelagic clay: implications for nuclear waste disposal in geological media, 8:53683 (J;US)
CALCIUM 40 TARGET
Pion Reactions
Study of isovector resonances with pion charge exchange, 8:55177 (J;NL)
CALCIUM COMPLEXES
Structural Chemical Analysis
Nuclear magnetic resonance study of ethylenediaminetetrakis(methylenephosphonic acid) and some metal complexes, 8:54332 (J;US)
CALCIUM FLUORIDES
Physical Radiation Effects
Damage ingrowth and recovery in alpha-irradiated CaF_2, SrF_2, and BaF_2, 8:54282 (J;GB)
CALCIUM OXIDES
Catalytic Effects
Effects of catalysts and CO_2 gasification on the ESR of carbon black. II, 8:53357 (J;US)
Chemical Reactions
Effect of lithium carbonate on the reaction of CaO powders with CO_2, 8:54308 (R;US)
CALDERAS
Mineral Resources
Relation of mercury, uranium, and lithium deposits to the McDermitt caldera complex, Nevada-Oregon, 8:53466 (R;US)

Uranium Deposits
Relation of mercury, uranium, and lithium deposits to the McDermitt caldera complex, Nevada-Oregon, 8:53466 (R;US)

CALIBRATION STANDARDS
Sample Preparation
Preparation of ultra-thin sources and calibration standards for coincident studies, at high resolution, of radiations emitted by the heavy elements, 8:55210 (RA;AU)

CALORIMETERS
Design
Large aperture calorimeter for fusion laser measurements, 8:55295 (R;US)

CALORIMETERS (PARTICLE)
See SHOWER COUNTERS

CALORIMETRIC DOSEMETERS
Calibration Standards
Microcalorimetric standard of absorbed dose, 8:54663 (RA;AU)

CALORIMETRY
Meetings
Calorimetry, 8:54709 (RA;US)

CAMAC SYSTEM
Computer Application to Measurement And Control.
Multicomputer measurement centre of the Laboratory of nuclear physics - a prototype of computer network for automation of scientific research, 8:54693 (R;SU;In Russian)
Computer Codes
Subsidiary FORTRAN subroutines at INS CAMAC system, 8:54608 (R;JP;In Japanese)
On-Line Measurement Systems
Unified system of collection, processing of experimental information and control, 8:54678 (R;SU;In Russian)

CANADA
See also ALBERTA
ONTARIO
Away-From-Reactor Storage
Status of dry storage of irradiated fuel in Canada, 8:53595 (BA;XN)
Coal Industry
Metallurgical coal in the 1980's - facts and prospects, 8:53423 (R;US)
Dry Storage
Evaluation of the use of concrete casks for irradiated fuel management, 8:53596 (BA;XN)
Status of dry storage of irradiated fuel in Canada, 8:53595 (BA;XN)
Pollution Sources
Estimation of wet and dry deposition of pollutant sulfur in eastern Canada as a function of major source regions, 8:54893 (J;NL)
Transfrontier Pollution
Estimation of wet and dry deposition of pollutant sulfur in eastern Canada as a function of major source regions, 8:54893 (J;NL)

CANCER
See NEOPLASMS

CANDU REACTOR
See DOUGLAS POINT ONTARIO REACTOR

CANDU TYPE REACTORS
See also DOUGLAS POINT ONTARIO REACTOR
Reactor Decommissioning
Canadian approach to decommissioning, 8:54008 (RA;US)
Spent Fuel Casks
Thermal analysis for the design of a CANDU irradiated fuel transportation cask, 8:54436 (RA;US)

CANONICAL EQUATIONS
See DIFFERENTIAL EQUATIONS

CARBAMIDE
See UREA

CARBENES
Synthesis
Theoretical studies of the potential surface for the reaction $C(^3P) + H_2 \rightarrow CH_2(^3B_1)$, 8:54365 (J;US)

CARBINOL
See METHANOL

CARBON
See also ACTIVATED CARBON
CARBON BLACK
DIAMONDS
Chemical Preparation
Carbon-particle generator, 8:53828 (P;US)
Chemical Reactions
Theoretical studies of the potential surface for the reaction $C(^3P) + H_2 \rightarrow CH_2(^3B_1)$, 8:54365 (J;US)
Proton Reactions
Deuteron production in proton-nucleus interactions at 7.5 GeV/c, 8:55183 (R;SU;In Russian)

CARBON 11
Positron Computed Tomography
L-[1-^{11}C]leucine: routine synthesis by enzymatic resolution, 8:54348 (J;US)

CARBON 12
Binding Energy
Binding energy calculations using the molecular orbital wave function, 8:55167 (R;XA)

CARBON 12 REACTIONS
Breakup Reactions
Fragment emission in reactions of 18.5 GeV ^{12}C ions with complex nuclei, 8:55179 (RA;FR)
Fusion Reactions
Calculation of fusion cross sections, 8:55175 (R;DD;In German)
Fusion of heavy ions in an interaction potential model, 8:55168 (R;PL;In Polish)

CARBON 12 TARGET
Beryllium 9 Reactions
Fusion of heavy ions in an interaction potential model, 8:55168 (R;PL;In Polish)
Carbon 12 Reactions
Calculation of fusion cross sections, 8:55175 (R;DD;In German)
Deuteron Reactions
Inelastic scattering of 8.9 GeV/c deuterons on carbon, 8:55171 (R;SU)
Study of the proton momentum spectrum from deuteron fragmentation at 8.9 GeV/c and an estimate of admixture parameters for the six-quark state in deuteron, 8:55170 (R;SU)
Neutron Reactions
Hyperon production in nC interactions in the neutron beam with approximately 40 GeV/c momentum, 8:55139 (R;SU;In Russian)
Pion Minus Reactions
Analysis of hadron jet behaviour in π^-C interactions at 40 GeV/c, 8:55173 (R;SU;In Russian)
Characteristics of secondary neutrons in the π^-p, π^-n, π^-^{12}C interactions at P–40 GeV/c, 8:55174 (R;SU;In Russian)
Correlation effects in multiple particle production on nuclei in the cumulative region, 8:55169 (R;SU)
Pion Reactions
Study of isovector resonances with pion charge exchange, 8:55177 (J;NL)
Proton Reactions
Experimental determination of the effective nucleon-nucleon interaction for P-nucleus reactions at intermediate energies, 8:55176 (J;NL)

CARBON 13
NMR Spectra
Cross polarization and magic angle sample spinning NMR spectra of model organic compounds. 1. Highly protonated molecules, 8:54334 (J;US)
Cross polarization and magic angle sample spinning NMR spectra of model organic compounds. 2. Molecules of low or remote protonation, 8:54335 (J;US)
Spin-Lattice Relaxation
Cross polarization and magic angle sample spinning NMR spectra of model organic compounds. 1. Highly protonated molecules, 8:54334 (J;US)

CARBON 14
Uptake
Applicability of the ^{14}C-specific activity model, 8:55061 (J;GB)

CARBON ADDITIONS
Thermodynamics
Thermodynamics of carbon in Ni-C alloys from 900 to 1215°C, 8:54247 (J;US)
CARBON BLACK
Gasification
Effects of catalysts and CO_2 gasification on the ESR of carbon black. II, 8:53357 (J;US)
Heat Treatments
Influence of heat-treatment and physicochemical properties on the electrochemical oxidation of carbon blacks in phosphoric acid, 8:54049 (R;US)
Oxidation
Influence of heat-treatment and physicochemical properties on the electrochemical oxidation of carbon blacks in phosphoric acid, 8:54049 (R;US)
CARBON DIOXIDE
Physico-chemical fracturing and cleaning of coal, 8:53412 (R;US)
Chemical Reactions
Effect of lithium carbonate on the reaction of CaO powders with CO_2, 8:54308 (R;US)
Environmental Impacts
Response of the North American corn belt to climatic warming, CO_2, 8:54881 (R;US)
Materials Recovery
CO_2-recovery from flue gases, 8:54886 (R;US)
Soil Chemistry
A timesaving technique for measuring respiration rates in incubated soil samples, 8:54913 (J;US)
Solvent Extraction
Process for removal of ammonia and acid gases from contaminated waters, 8:54948 (P;US)
CARBON MONOXIDE
Ecological Concentration
National Performance Audit Program. Ambient air audits of analytical proficiency, 1981, 8:54904 (R;US)
CARBON STEELS
Chemical Composition
Corrosion response of downhole steam generator assembly and instrumentation and supply line tubings at Long Beach field test, 8:53434 (R;US)
Corrosion
Corrosion response of downhole steam generator assembly and instrumentation and supply line tubings at Long Beach field test, 8:53434 (R;US)
Review of DOE waste package program. Subtask 1.1. National waste package program, October 1982-March 1983. Vol. 4, 8:53652 (R;US)
Failures
Review of DOE waste package program. Subtask 1.1. National waste package program, October 1982-March 1983. Vol. 4, 8:53652 (R;US)
Ultimate Strength
Corrosion response of downhole steam generator assembly and instrumentation and supply line tubings at Long Beach field test, 8:53434 (R;US)
Yield Strength
Corrosion response of downhole steam generator assembly and instrumentation and supply line tubings at Long Beach field test, 8:53434 (R;US)
CARBONACEOUS MATERIALS
See also COAL
OIL SANDS
OIL SHALES
Mass Spectroscopy
Direct mass-spectrometric studies of the pyrolysis of carbonaceous fuels. I. A flame-pyrolysis molecular-beam sampling technique, 8:53352 (J;NL)
Pyrolysis
Direct mass-spectrometric studies of the pyrolysis of carbonaceous fuels. I. A flame-pyrolysis molecular-beam sampling technique, 8:53352 (J;NL)
CARBOXYLIC ACIDS
See also AMINO ACIDS
NMR Spectra
Cross polarization and magic angle sample spinning NMR spectra of model organic compounds. 1. Highly protonated molecules, 8:54334 (J;US)
Spin-Lattice Relaxation
Cross polarization and magic angle sample spinning NMR spectra of model organic compounds. 1. Highly protonated molecules, 8:54334 (J;US)
CARCINOGENESIS
Risk Assessment
Follow-up studies on A-bomb survivors: implications for radiological protection, 8:55016 (RA;US)
Theoretical epidemiology applied to health physics: estimation of the risk of radiation-induced breast cancer, 8:55013 (RA;US)
CARCINOGENS
Dose-Response Relationships
Estimating the carcinogenetic effects on humans of low doses of radiation or chemicals, 8:55066 (J;US)
CARCINOMAS
Radioinduction
Impact of radiobiological considerations on epidemiological inferences of age-dependent radiosensitivity, 8:55038 (RA;US)
Skin dose and response for the head and neck in patients irradiated with x-ray for tinea capitis: implications for environmental radioactivity, 8:55012 (RA;US)
CAROLINA POWER LIGHT ROBINSON-2 REACTOR
See ROBINSON-2 REACTOR
CASKS
See also SPENT FUEL CASKS
Certification
Upgrading the DOT 6M-2R shipping package, 8:54435 (RA;US)
Design
Design concept for a defense high-level waste shipping cask: truck (For high-level wastes), 8:54421 (RA;US)
Development of plutonium oxide power packaging (PUCON type packaging), 8:54397 (RA;US)
Development of a transport cask for contaminated steam generators, 8:54419 (RA;US)
FFTF disposable solid waste cask: a study in the effectiveness of concrete as a packaging material, 8:54442 (RA;US)
SSITS cask: a capsule transportation system, 8:53540 (RA;US)
Economic Analysis
Economic evaluation of nuclear waste transportation casks, 8:54445 (RA;US)
Fabrication
FFTF disposable solid waste cask: a study in the effectiveness of concrete as a packaging material, 8:54442 (RA;US)
Impact Strength
Seismic evaluation of headframe and associated equipment, 8:53661 (R;US)
Impact Tests
Experimental and analytical program to evaluate packaging and target hardness as related to nuclear waste transportation systems, 8:54427 (RA;US)
Two- and three-dimensional dynamic analyses of DHLW casks, 8:54450 (RA;US)
Maintenance
Operation and maintenance of the T-3 cask system, 8:54420 (RA;US)
Materials Testing
FFTF disposable solid waste cask: a study in the effectiveness of concrete as a packaging material, 8:54442 (RA;US)
Mechanical Tests
Low-cost/high-capacity waste casks: the MOSAIK family, 8:53637 (RA;US)
Operation
Operation and maintenance of the T-3 cask system, 8:54420 (RA;US)
Performance Testing
Analytical/experimental program to assess thermal response to geometrically simulated casks to engulfing fires, 8:54440 (RA;US)

Low-cost/high-capacity waste casks: the MOSAIK family, 8:53637 (RA;US)
Radiative Cooling
Thermal diode cooling fin concept, 8:54396 (RA;US)
Seals
Factors influencing the design and assessment of elastomer seals for nuclear fuel transport flasks, 8:54411 (RA;US)
Fundamental studies on the performance of O-ring seal for cask, 8:54412 (RA;US)
Helium/solid powder O-ring leakage correlation experiments, 8:54410 (RA;US)
In-situ permeation tests of elastomeric O-ring seals, 8:54413 (RA;US)
Metallic seal testing, 8:54414 (RA;US)
Temperature Effects
Analytical/experimental program to assess thermal response to geometrically simulated casks to engulfing fires, 8:54440 (RA;US)
Caldecott tunnel fire thermal environments, regulatory considerations and probabilities (Type B packaging), 8:53576 (RA;US)
Thermodynamic Properties
Caldecott tunnel fire thermal environments, regulatory considerations and probabilities (Type B packaging), 8:53576 (RA;US)

CAST IRON
Fracture Properties
Assessment of cast irons for structural components in nuclear material transportation systems, 8:54384 (RA;US)
Properties of nodular ductile graphite cast iron used in GNS-manufactured spent fuel casks, 8:54381 (RA;US)
Mechanical Properties
Design criteria for nodular cast iron shipping containers, 8:54383 (RA;US)
Tensile Properties
TN 1300 cask casting process and material qualification, 8:54382 (RA;US)

CASTE (INSECTS)
See INSECTS OCCUPATIONS

CATALYST SUPPORTS
Electronic Structure
Role of d-electrons in chemisorption and metal/support interactions studied by electron spectroscopy. Progress report, January 15, 1983-January 14, 1984, 8:55112 (R;US)

CATALYSTS
Chemical Reactions
Transient response of continuous-flow stirred reactors containing heterogeneous systems for catalysis or sorption, 8:54320 (J;GB)
Deactivation
Experimental studies on the control of hydrocarbons emission from a gasifier. Final report, September 1981-February 1983, 8:53337 (R;US)
Solvent tailoring in coal liquefaction. Quarterly report, November 1982-February 1983, 8:53341 (R;US)
Solvent tailoring in coal liquefaction. Quarterly report, August 1982-November 1982, 8:53339 (R;US)
Studies on aged H-Coal catalysts. Final report, 8:53350 (R;US)
Density
Cooperative investigation by Auburn University and Cities Service Research and Development Company of combined coal and heavy-resid processing. Quarterly report, January 15, 1983-April 15, 1983, 8:53345 (R;US)
Electron Spectroscopy
Studies on aged H-Coal catalysts. Final report, 8:53350 (R;US)
Electronic Structure
Role of d-electrons in chemisorption and metal/support interactions studied by electron spectroscopy. Progress report, January 15, 1983-January 14, 1984, 8:55112 (R;US)
Meetings
Technology of preparation, combustion and commercial application of coal-water slurry fuels; shape selective catalysis and synthesis gas chemistry: routes to chemicals and fuels; general papers: combustion and coke; chemistry of combustion processes (abstracts only); pyrolysis processes and products from heavy feedstocks (abstracts only), 8:53422 (B;US)
Porosity
Cooperative investigation by Auburn University and Cities Service Research and Development Company of combined coal and heavy-resid processing. Quarterly report, January 15, 1983-April 15, 1983, 8:53345 (R;US)
Regeneration
Studies on aged H-Coal catalysts. Final report, 8:53350 (R;US)
Research Programs
Solid-state, surface, and catalytic properties of oxides. Progress report, October 1, 1982-August 31, 1983, 8:54306 (R;US)

CATALYTIC CRACKING
Catalysts
Experimental studies on the control of hydrocarbons emission from a gasifier. Final report, September 1981-February 1983, 8:53337 (R;US)
Chemical Reaction Kinetics
Experimental studies on the control of hydrocarbons emission from a gasifier. Final report, September 1981-February 1983, 8:53337 (R;US)

CATHODES
Design
Positive-electrode current collector for liquid-metal cells, 8:54051 (P;US)

CATION EXCHANGE CAPACITY
See CATIONS

CATIONS
See also HYDROGEN IONS 1 PLUS
Separation Processes
Separation of selected cations by liquid membranes. Progress report, 1 December 1982-31 August 1983, 8:54292 (R;US)

CAUCHY PROBLEM
Dissertation in interpolation, 8:55231 (TJ;US)
Remarks on the differences that distinguish the interpolation of Cauchy from the least-squares method and which assure the priority of this method, 8:55232 (TJ;US)

CAUSTIC FLOODING
Demonstration Programs
Improved secondary oil recovery by controlled waterflooding-pilot demonstration: Ranger Zone, Fault Block VII, Wilmington Field. Phase IV. Quarterly report, April-June 1983, 8:53433 (R;US)

CAVITY RECEIVERS
Design
Heating system for a solar receiver, 8:53793 (P;FR;In French)

CAVITY RESONATORS
Instability
Calculation on longitudinal instability due to RF cavities, 8:54618 (R;JP)
Instability Growth Rates
Calculation on longitudinal instability due to RF cavities, 8:54618 (R;JP)

CBA (BROOKHAVEN COLLIDING BEAM ACCELERATO
See ISABELLE STORAGE RINGS

CEA SACLAY
Superconducting Magnets
Superconducting magnet activities at CEN Saclay. A brief summary, 8:54474 (R;JP)

CELL GROWTH (ANIMAL)
See ANIMAL CELLS

CELLS (ANIMAL)
See ANIMAL CELLS

CELLS (BACTERIAL)
See BACTERIA

CELLS (REACTOR)
See REACTOR CELLS

CELLULOSE
Mass Spectroscopy
Direct mass-spectrometric studies of the pyrolysis of carbonaceous fuels. II. Qualitative observations of primary and secondary processes in biomass, 8:53783 (J;NL)
Pyrolysis
Direct mass-spectrometric studies of the pyrolysis of carbonaceous fuels. II. Qualitative observations of primary and secondary processes in biomass, 8:53783 (J;NL)

CEMENTS
Magnesium-phosphate-glass cements with ceramic-type properties, 8:54284 (P;US)
CENTAURO-TYPE EVENTS
Proposal for the establishment of a national underground physics laboratory, 8:54656 (RA;US)
CENTRAL HEATING PLANTS
District-heating handbook. Volume 1. A design guide (Book), 8:54190 (B;US)
CERAMICS
Failures
Role of microstructural inhomogeneities on high-temperature failure in ceramics, 8:54257 (R;US)
Service Life
Durability of marker materials for nuclear waste isolation sites, 8:53670 (R;US)
CERAMICS INDUSTRY
Energy Conservation
Innovative industrial-materials processes, 8:54175 (R;US)
CEREALS
See also RICE
Radioactivity
Preliminary investigation of radiation level and some radionuclides in imported food and food products, 8:54295 (R;TH)
Radiometric Analysis
Preliminary investigation of radiation level and some radionuclides in imported food and food products, 8:54295 (R;TH)
CEREBRUM
Positron Computed Tomography
L-[1-^{11}C]leucine: routine synthesis by enzymatic resolution, 8:54348 (J;US)
CERIUM 143
Beta-Minus Decay
γ-ray emission probability for the decay of ^{143}Ce, 8:55191 (J;GB)
CERIUM COMPOUNDS
Crystal-Phase Transformations
Electronically induced phase transformations. Annual report 1 Oct 81-30 Sep 82, 8:54270 (R;US)
CERMETS
Thermal Shock
Thermal-shock resistant alumina-metal cermet insulators, 8:54261 (J;US)
CERN II SYNCHROTRON
See CERN SPS SYNCHROTRON
CERN SPS SYNCHROTRON
Research Programs
Workshop on SPS fixed-target phsics in the years 1984-1989. Vol. 1. Proceedings, 8:55133 (R;XC)
Shower Counters
Search for hadron jets and large transverse momentum electrons at the SPS anti p p collider, 8:55140 (RA;US)
CERRO PRIETO GEOTHERMAL FIELD
Ground Subsidence
Regional and local networks of horizontal control, Cerro Prieto Geothermal Area, Mexico, 8:53833 (R;US)
Surveys
Regional and local networks of horizontal control, Cerro Prieto Geothermal Area, Mexico, 8:53833 (R;US)
CESIUM
Biogeochemistry
Ecological Research Division Marine Research Program, 8:54951 (R;US)
CESIUM 137
Food Chains
Preliminary investigation of radiation level and some radionuclides in imported food and food products, 8:54295 (R;TH)
Gamma Spectroscopy
Preliminary investigation of radiation level and some radionuclides in imported food and food products, 8:54295 (R;TH)
Ingestion
Imprecision in estimates of dose from ingested ^{137}Cs due to variability in human biological characteristics, 8:55062 (J;GB)
Radiation Doses
Imprecision in estimates of dose from ingested ^{137}Cs due to variability in human biological characteristics, 8:55062 (J;GB)
Radioecological Concentration
Comparative behavior of ^{99}Tc, ^{129}I, ^{127}I and ^{137}Cs in the environment adjacent to a fuels reprocessing facility, 8:54928 (J;GB)
Radionuclide concentrations in vegetation at a solid radioactive waste-disposal area in southeastern Idaho, 8:54932 (J;US)
Strontium-90 and cesium-137 in marine sediment; April, 1978 to March, 1979. Radioactivity survey related with environmental and dietary materials, 8:54934 (RA;JP)
Strontium-90 and cesium-137 in soil: April 1978 to March 1979. Radioactivity survey related with environmental and dietary materials, 8:54906 (RA;JP)
Strontium-90 and cesium-137 in service water; April, 1978 to September, 1978. Radioactivity survey related with environmental and dietary materials, 8:54935 (RA;JP)
Strontium-90 and cesium-137 in sea water; April, 1978 to March, 1979. Radioactivity survey related with environmental and dietary materials, 8:54936 (RA;JP)
Strontium-90 and cesium-137 in rain and dry fallout; April, 1978 to December, 1978. Radioactivity survey related with environmental and dietary materials, 8:54874 (RA;JP)
Strontium-90 and cesium-137 in air-borne dust; April, 1978 to September, 1978. Radioactivity survey related with environmental and dietary materials, 8:54875 (RA;JP)
Strontium-90 and cesium-137 in total diet; April, 1978 to March, 1979. Radioactivity survey related with environmental and dietary materials, 8:54907 (RA;JP)
The relative importance of uptake and surface adherence in determining the radionuclide contents of subterranean crops, 8:54929 (J;GB)
Spatial Distribution
Comparative behavior of ^{99}Tc, ^{129}I, ^{127}I and ^{137}Cs in the environment adjacent to a fuels reprocessing facility, 8:54928 (J;GB)
CESIUM CARBONATES
Catalytic Effects
Study of the role of alkali metal salts as char gasification catalysts by Knudsen cell mass spectrometry, 8:53356 (J;US)
CESIUM IODIDES
Vacuum Evaporation
Deposition of cesium iodide on parylene, 8:54771 (R;US)
CHARGED PARTICLE DETECTION
See also ALPHA DETECTION
ELECTRON DETECTION
MUON DETECTION
PION DETECTION
POSITRON DETECTION
PROTON DETECTION
Variable geometry high-purity germanium detector telescope system for use with intermediate energy charged particles, 8:54748 (J;NL)
Stochastic Processes
One problem of the busy period determination in queues with infinitely many servers, 8:54701 (R;SU)
CHARM PARTICLES
Particle Production
High-energy physics progress report, 1983-1984, 8:55138 (R;US)
Reviews
Masses, decay modes and lifetimes of charmed particles, 8:55143 (TG;DE)
Weak Hadronic Decay
New particles and decays, 8:55131 (RA;XC)
CHARPAK CHAMBERS
See MULTIWIRE PROPORTIONAL CHAMBERS
CHARS
Gasification
Transient kinetic studies of char reactions in a gradientless reactor system: CO_2 gasification, 8:53355 (J;US)
CHEMICAL BONDS
Cleavage
Dependence of liquefaction behavior on coal characteristics. Part IV. Contributions to the understanding of the

phenomenology of coal liquefaction. Final technical report, March 1981-February 1984, 8:53342 (R;US)
Facile reaction/extraction of coal with supercritical fluids. Quarterly technical progress report, April 1, 1983-June 30, 1983, 8:53344 (R;US)

CHEMICAL EXPLOSIONS

Computerized Simulation
Numerical simulations of non-ideal detonations of a heterogeneous explosive with the two dimensional eulerian code C.E.E., 8:54837 (RA;US)

Detonations
Detonation temperature of some liquid explosives, 8:54844 (RA;US)

Equations of State
Detonation properties of condensed explosives calculated with an equation of state based on intermolecular potentials, 8:54838 (RA;US)
Development of a single species equation of state for detonation products suitable for hydrocode calculations, 8:54840 (RA;US)
Explosive equation of state determination by the AWRE method, 8:54835 (RA;US)
Theoretical EOS for reaction products of RDX, 8:54839 (RA;US)

Infrared Radiation
Ir spectral signatures of the millrace debris cloud. Technical report, 8:54784 (R;US)

Reviews
Short survey of detonation research in China, 8:54847 (RA;US)

Temperature Measurement
Brightness temperature of detonation wave in nitromethane-tetranitromethane mixtures and in gaseous mixtures at a high initial pressure, 8:54845 (RA;US)
Detonation temperature of some liquid explosives, 8:54844 (RA;US)

X-Ray Radiography
Flash x-ray cineradiography @ 100,000 FPS, 8:54861 (RA;US)

CHEMICAL EXPLOSIVES

See also DYNAMITE
NITROGLYCERIN
NITROMETHANE
PETN
SHAPED CHARGES
TATB
TNT

Activation Energy
Thermal decomposition of RDX below the melting point, 8:54793 (RA;US)

Chemical Explosions
Numerical simulations of non-ideal detonations of a heterogeneous explosive with the two dimensional eulerian code C.E.E., 8:54837 (RA;US)

Combustion
Deflagration-to-detonation transition studies of porous explosive charges in plastic tubes, 8:54797 (RA;US)
Deflagration detonation transition in waxes RDX, 8:54798 (RA;US)
Deflagration from an ignition site of a confined explosive charge as a function of venting by orifice flow, 8:54802 (RA;US)
Effects of igniter and compaction on DDT run up in plastic pipes, 8:54799 (RA;US)
Improved prediction of flame spreading during convective burning in solid propellant cracks, 8:54361 (RA;US)
Mechanism for the burning rate of high density, porous, energetic materials, 8:54803 (RA;US)
Phenomenology of the deflagration to detonation transition in propellants and explosives, 8:54805 (RA;US)
Role of gas phase reactions in deflagration-to-detonation transition, 8:54804 (RA;US)
Transitions from laminar burning for porous crystalline explosives, 8:54801 (RA;US)

Combustion Products
Deflagration from an ignition site of a confined explosive charge as a function of venting by orifice flow, 8:54802 (RA;US)

Deformation
Microhardness study of RDX to assess localized deformation and its role in hot spot formation, 8:54860 (RA;US)

Density
Studies on transition from deflagration to detonation in high explosives at very small diameters, 8:54796 (RA;US)

Detonation Waves
Inverse multi-streak-technique, 8:54843 (RA;US)

Detonations
Acceleration of two metal plates in an He-metal sandwich, 8:54848 (RA;US)
Anomalous burning rate characteristics of composition B and TNT, 8:54853 (RA;US)
Brightness temperature of detonation wave in nitromethane-tetranitromethane mixtures and in gaseous mixtures at a high initial pressure, 8:54845 (RA;US)
Chapman-Jouguet detonation and its acceleration for a perfect fluid without conduction, 8:54832 (RA;US)
Characterization of the DDT explosive, CP, 8:54852 (RA;US)
Comparison of TATB and DINGU explosive properties, 8:54825 (RA;US)
Constitutive model for calculating chemical energy release rates from the flow fields in shocked explosives, 8:54822 (RA;US)
Critical conditions for shock initiation of detonation by small projectile impact, 8:54812 (RA;US)
Decomposition reaction kinetics in shock wave front, 8:54846 (RA;US)
Deflagration-to-detonation transition studies of porous explosive charges in plastic tubes, 8:54797 (RA;US)
Deflagration detonation transition in waxes RDX, 8:54798 (RA;US)
Delayed detonation in card gap tests, 8:54807 (RA;US)
Detonation in intermolecular explosives: characteristics of some eutectic formulations (Eutectic of ethylenediamine dinitrate and ammonium nitrate), 8:54826 (RA;US)
Detonation properties of condensed explosives calculated with an equation of state based on intermolecular potentials, 8:54838 (RA;US)
Detonation temperature of some liquid explosives, 8:54844 (RA;US)
Development of a single species equation of state for detonation products suitable for hydrocode calculations, 8:54840 (RA;US)
Diverging detonations in RDX and PETN based cast-cured PBX, 8:54818 (RA;US)
Effect of cavitation on the shock sensitivity of liquid explosives, 8:54817 (RA;US)
Effects of igniter and compaction on DDT run up in plastic pipes, 8:54799 (RA;US)
Electron beam initiation of high explosives, 8:54791 (RA;US)
Elementary solution for the equations of the zeroth order internal structure of a strong detonation in a solid high explosive, 8:54836 (RA;US)
Experimental investigation of hot spots produced by high rate deformation and shocks, 8:54859 (RA;US)
Explosive equation of state determination by the AWRE method, 8:54835 (RA;US)
Factors affecting the explosiveness of munition fillings, 8:54864 (RA;US)
Hot spot and bulk temperature induction in shock compressed explosives, 8:54824 (RA;US)
Ignition of solid high explosive by the rapid compression of an adjacent gas layer, 8:54786 (RA;US)
Improved approximate model of explosive casing expansion, 8:54850 (RA;US)
Influence of the dynamic compressive strength properties of HE formulations on the growth of reaction, 8:54787 (RA;US)
Influence of inert binders on detonation properties of cast-cured PBX, 8:54827 (RA;US)
Influence of the reaction zone on the state of detonation in a steady axial wave, 8:54834 (RA;US)
Initiation of explosive charges by rapid shear, 8:54789 (RA;US)
Initiation of burning and detonation in cast H-6 and cast PBXW-109, 8:54811 (RA;US)
Instrumented shotgun facility to study impact initiated explosive reactions, 8:54810 (RA;US)

Investigation of transient processes at initiation of high explosives, 8:54816 (RA;US)
Lagrange gage studies in ideal and non-ideal explosives, 8:54867 (RA;US)
Low energy laser initiation of single crystals of β-lead azide, 8:54841 (RA;US)
Mechanism of initiation of composition B by A metal jet, 8:54815 (RA;US)
Microhardness study of RDX to assess localized deformation and its role in hot spot formation, 8:54860 (RA;US)
Model of impact ignition and explanation of critical shock initiation energy. II. Application, 8:54821 (RA;US)
Nondetonative explosions in confined explosive charges, 8:54806 (RA;US)
Numerical simulations of non-ideal detonations of a heterogeneous explosive with the two dimensional eulerian code C.E.E., 8:54837 (RA;US)
Numerical study of detonation propagation between munitions, 8:54866 (RA;US)
Planar flyer plate driven by detonation product convergent flow, 8:54849 (RA;US)
Raman scattering temperature measurement behind a shock wave, 8:54863 (RA;US)
Response of confined explosive charges to fragment attack, 8:54865 (RA;US)
Role of excited electronic states in the bond-scission process in detonation reactions, 8:54795 (RA;US)
Sensitivity to initiation of HE-wax compounds at different temperatures, 8:54813 (RA;US)
Shock initiation and subsequent growth of reaction in explosives and propellants: the low amplitude shock initiation test, LASI, 8:54809 (RA;US)
Short survey of detonation research in China, 8:54847 (RA;US)
Simplified methods for predicting explosive performance parameters including Eremenko's relative detonation impulses, 8:54857 (RA;US)
Simulation of the reaction zone of heterogeneous explosives, 8:54833 (RA;US)
Some results on the converging spherical detonation in a solid explosive, 8:54831 (RA;US)
Studies on transition from deflagration to detonation in high explosives at very small diameters, 8:54796 (RA;US)
Theoretical EOS for reaction products of RDX, 8:54839 (RA;US)
Theory to predict the velocity-diameter relation of explosives, 8:54830 (RA;US)
Thermocouple temperature measurements in shock initiated PBX-9404, 8:54862 (RA;US)
Two-phase visco-plastic model of shock initiation of detonation in high density pressed explosives, 8:54820 (RA;US)
Void collapse model for shock initiation, 8:54823 (RA;US)

Equations of State
Characterization of the DDT explosive, CP, 8:54852 (RA;US)

Flame Propagation
Improved prediction of flame spreading during convective burning in solid propellant cracks, 8:54361 (RA;US)
Phenomenology of the deflagration to detonation transition in propellants and explosives, 8:54805 (RA;US)

Flammability
Transitions from laminar burning for porous crystalline explosives, 8:54801 (RA;US)

Hazards
Factors affecting the explosiveness of munition fillings, 8:54864 (RA;US)

Heating
Electron beam initiation of high explosives, 8:54791 (RA;US)

Hot Spots
Formation and distribution of hot spots in slurry explosives under projectile impact, 8:54814 (RA;US)

Ignition
Role of gas phase reactions in deflagration-to-detonation transition, 8:54804 (RA;US)

Impact Shock
Formation and distribution of hot spots in slurry explosives under projectile impact, 8:54814 (RA;US)

Impact Tests
Characterization of the DDT explosive, CP, 8:54852 (RA;US)
Laboratory scale sensitivity testing of insensitive high explosives (Drop hammer and thermal testing of HMX and TATB), 8:54858 (RA;US)

Mechanical Properties
Influence of the dynamic compressive strength properties of HE formulations on the growth of reaction, 8:54787 (RA;US)

Meetings
Detonation. Proceedings, 8:54785 (R;US)

Microhardness
Microhardness study of RDX to assess localized deformation and its role in hot spot formation, 8:54860 (RA;US)

Molecular Structure
Molecular electronic structure and initiation of secondary explosives, 8:54792 (RA;US)

Particle Size
Studies on transition from deflagration to detonation in high explosives at very small diameters, 8:54796 (RA;US)
Transitions from laminar burning for porous crystalline explosives, 8:54801 (RA;US)

Performance
Some comments regarding the sensitivities, thermal stabilities, and explosive performance characteristics of fluorodinitromethyl compounds, 8:54794 (RA;US)

Porosity
Mechanism for the burning rate of high density, porous, energetic materials, 8:54803 (RA;US)

Pressure Gradients
Effects of igniter and compaction on DDT run up in plastic pipes, 8:54799 (RA;US)

Pyrolysis
Thermal decomposition of RDX below the melting point, 8:54793 (RA;US)

Sensitivity
Characterization of the DDT explosive, CP, 8:54852 (RA;US)
Critical conditions for shock initiation of detonation by small projectile impact, 8:54812 (RA;US)
Delayed detonation in card gap tests, 8:54807 (RA;US)
Detonation in intermolecular explosives: characteristics of some eutectic formulations (Eutectic of ethylenediamine dinitrate and ammonium nitrate), 8:54826 (RA;US)
Effect of cavitation on the shock sensitivity of liquid explosives, 8:54817 (RA;US)
Effect of base gaps on setback-shock sensitivities of cast composition B and TNT as determined by the NSWC setback-shock simulator, 8:54855 (RA;US)
Effects of igniter and compaction on DDT run up in plastic pipes, 8:54799 (RA;US)
Exploding foil shock sensitivity test, 8:54856 (RA;US)
Ignition of solid high explosive by the rapid compression of an adjacent gas layer, 8:54786 (RA;US)
Initiation of burning and detonation in cast H-6 and cast PBXW-109, 8:54811 (RA;US)
Laboratory scale sensitivity testing of insensitive high explosives (Drop hammer and thermal testing of HMX and TATB), 8:54858 (RA;US)
Molecular electronic structure and initiation of secondary explosives, 8:54792 (RA;US)
Sensitivity to initiation of HE-wax compounds at different temperatures, 8:54813 (RA;US)
Shock initiation and subsequent growth of reaction in explosives and propellants: the low amplitude shock initiation test, LASI, 8:54809 (RA;US)
Some comments regarding the sensitivities, thermal stabilities, and explosive performance characteristics of fluorodinitromethyl compounds, 8:54794 (RA;US)
Studies on transition from deflagration to detonation in high explosives at very small diameters, 8:54796 (RA;US)

Shear
Initiation of explosive charges by rapid shear, 8:54789 (RA;US)

Stability
Some comments regarding the sensitivities, thermal stabilities, and explosive performance characteristics of fluorodinitromethyl compounds, 8:54794 (RA;US)

Temperature Gradients
Initiation of explosive charges by rapid shear, 8:54789 (RA;US)

Thermal Testing
Laboratory scale sensitivity testing of insensitive high explosives (Drop hammer and thermal testing of HMX and TATB), 8:54858 (RA;US)
Wave Propagation
Nondetonative explosions in confined explosive charges, 8:54806 (RA;US)
CHEMICAL FEEDSTOCKS
Meetings
Technology of preparation, combustion and commercial application of coal-water slurry fuels; shape selective catalysis and synthesis gas chemistry: routes to chemicals and fuels; general papers: combustion and coke; chemistry of combustion processes (abstracts only); pyrolysis processes and products from heavy feedstocks (abstracts only), 8:53422 (B;US)
Pyrolysis
Technology of preparation, combustion and commercial application of coal-water slurry fuels; shape selective catalysis and synthesis gas chemistry: routes to chemicals and fuels; general papers: combustion and coke; chemistry of combustion processes (abstracts only); pyrolysis processes and products from heavy feedstocks (abstracts only), 8:53422 (B;US)
CHEMICAL INDUSTRY
Energy Conservation
Innovative industrial-materials processes, 8:54175 (R;US)
Federal Republic of Germany
VEBA-report on activities in 1980, 8:55326 (R;DE;In German)
CHEMICAL LASERS
Boundary Layers
F^2 boundary layer measurement in a chemical laser slit nozzle flow. Technical report, 8:54492 (R;US)
Design
Study of short pulse mercury bromide laser. Final report, 15 March-30 November 1982, 8:54497 (R;US)
Dissociation
Alkali-rare gas and metal-halide molecules as potential tunable and efficient lasers in the visible. Final report, 1 October 1981-30 September 1982, 8:54499 (R;US)
Electron Beam Pumping
Pulsed chemical laser with variable-pulse-length electron-beam initiation and magnetic confinement. Technical report Nov 79-Apr 80, 8:54505 (R;US)
Feasibility Studies
Summary report: laser candidates for inertial fusion, 8:55288 (R;US)
Gas Flow
F-atom depletion in Nf^3 combustor laser flows. Technical report, 8:54494 (R;US)
Laser Materials
Alkali-rare gas and metal-halide molecules as potential tunable and efficient lasers in the visible. Final report, 1 October 1981-30 September 1982, 8:54499 (R;US)
Nozzles
F^2 boundary layer measurement in a chemical laser slit nozzle flow. Technical report, 8:54492 (R;US)
Operation
Study of short pulse mercury bromide laser. Final report, 15 March-30 November 1982, 8:54497 (R;US)
Performance
Pulsed chemical laser with variable-pulse-length electron-beam initiation and magnetic confinement. Technical report Nov 79-Apr 80, 8:54505 (R;US)
Research Programs
Alkali-rare gas and metal-halide molecules as potential tunable and efficient lasers in the visible. Final report, 1 October 1981-30 September 1982, 8:54499 (R;US)
CHEMICAL REACTORS
Bubbles
Apparatus for contact reaction, 8:54490 (TG;US)
Design
Apparatus for contact reaction, 8:54490 (TG;US)
Experimental studies on the control of hydrocarbons emission from a gasifier. Final report, September 1981-February 1983, 8:53337 (R;US)
Level Indicators
Modulated control system for improved regulation in on/off mode automatic controllers, 8:53363 (P;US)
Operation
Transient response of continuous-flow stirred reactors containing heterogeneous systems for catalysis or sorption, 8:54320 (J;GB)
CHEMICALS
See CARCINOGENS
SOLVENTS
CHERENKOV COUNTERS
Other physics experiments at the Homestake Mine, 8:54653 (RA;US)
Prospects for very large, sensitive water Cherenkov detectors for proton decay and neutrino oscillations search, 8:54650 (RA;US)
Review of the status of proton decay experiments outside the USA, 8:54649 (RA;US)
Status of the HPW nucleon decay detector, 8:54646 (RA;US)
Focusing
Cedar counters for particle identification in the SPS secondary beams: A description and an operation manual, 8:54672 (R;XC)
Images
Prospects for Cerenkov ring imaging at hadron colliders, 8:54721 (RA;US)
Specifications
Threshold Cherenkov counter, 8:54692 (R;SU;In Russian)
Threshold Detectors
Threshold Cherenkov counter, 8:54692 (R;SU;In Russian)
CHERENKOV DETECTORS
See CHERENKOV COUNTERS
CHERENKOV RADIATION
Mathematical Models
Treatment of Cerenkov radiation from electric and magnetic charges in dispersive and dissipative media, 8:55203 (R;XA)
CHESAPEAKE BAY
Aquatic Ecosystems
Animal-sediment relationships: a case study of the Patapsco River, 8:54955 (R;US)
CHEW-LOW METHOD
Born Approximation
Cubic approximation and local limitations to functional arbitraries in the general solution of Chew-Low equations, 8:55225 (R;SU;In Russian)
CHIMNEYS
Design
Determination of good-engineering-practice stack height: a fluid mode demonstration study for a power plant, 8:53860 (R;US)
CHINA
Hydraulic Turbines
Chinese experiences in small mini hydro power generation, 8:53747 (R;US)
CHINESE HAMSTER OVARY CELLS
See CHO CELLS
CHIRAL SYMMETRY
Symmetry Breaking
Lattice QCD with light quark masses: Does chiral symmetry get broken spontaneously, 8:55146 (R;DE)
Studies of chiral symmetry breaking in lattice gauge theory, 8:55155 (R;US)
CHLOR-ALKALI INDUSTRY
See CHEMICAL INDUSTRY
CHLORINE
SODIUM CARBONATES
SODIUM HYDROXIDES
CHLORINATED ALIPHATIC HYDROCARBONS
Photochemical Reactions
Photochemical cycloadditions of 2,3-dihalobenzo[b]thiophenes: stereochemical and mechanistic results, 8:53740 (J;US)
CHLORINATED AROMATIC HYDROCARBONS
Ecological Concentration
Polychlorinated biphenyls in the sediments of the Inner Oslofjord, 8:54947 (J;NL)

Photochemical Reactions
Photochemical cycloadditions of 2,3-dihalobenzo[b]thiophenes: stereochemical and mechanistic results, 8:53740 (J;US)

CHLORINE
Activation Analysis
Elemental composition of human and animal milk. A review. A report prepared under the auspices of the IAEA in collaboration with the WHO, 8:54983 (R;XA)

CHLORINE 35 REACTIONS
Fusion Reactions
Fusion of heavy ions in an interaction potential model, 8:55168 (R;PL;In Polish)

CHLORINE CHLORIDES
See CHLORINE

CHLORINE IONS
Ion-Atom Collisions
Interference effects in the quasimolecularen K-radiation induced in collisions of hydrogen-like ions, 8:55105 (R;DE;In German)

CHLOROPHYLL
See also PHOTOSYNTHETIC REACTION CENTERS
Absorption Spectra
Anion radicals of bacteriochlorophylls c, d, and e. Likely electron acceptors in the primary photochemistry of green and brown photosynthetic bacteria, 8:54339 (J;US)
Electron Spin Resonance
Anion radicals of bacteriochlorophylls c, d, and e. Likely electron acceptors in the primary photochemistry of green and brown photosynthetic bacteria, 8:54339 (J;US)
Redox Potential
Anion radicals of bacteriochlorophylls c, d, and e. Likely electron acceptors in the primary photochemistry of green and brown photosynthetic bacteria, 8:54339 (J;US)

CHO CELLS
Mutations
Detection of deletion mutations at the gpt locus in pSV2gpt transformed CHO cells, 8:55039 (R;US)

CHONDROSARCOMAS
See SARCOMAS
SKELETAL DISEASES

CHROMIUM
Activation Analysis
Elemental composition of human and animal milk. A review. A report prepared under the auspices of the IAEA in collaboration with the WHO, 8:54983 (R;XA)
Biological Effects
Inhibition of nitrification by chromium in a biodisc system, 8:55068 (R;US)
Electrodeposition
Structure of electrodeposited chromium, 8:54227 (RA;US)
Electroplating
Conditions for dropwise condensation on electroplated gold. Final report, February 15, 1980-August 14, 1983, 8:54209 (R;US)
Grain Size
Structure of electrodeposited chromium, 8:54227 (RA;US)
Metallurgical Effects
Study of iron self-diffusion in gamma-phase field of iron-chromium binary system, 8:54213 (R;SU;In Russian)

CHROMIUM ALLOYS
See also ALLOY-A-286
STAINLESS STEELS
Microstructure
HVEM studies of precipitate morphology symmetries (Fe-Cu; Cu-Cr; Fe-N), 8:54225 (RA;US)
Physical Radiation Effects
Comparison of the effect of electron and ion irradiation on crystallization of amorphous alloys (62Fe16Cr8Ni14W; 50Mo50Ni), 8:54235 (RA;US)
Swelling of high-nickel Fe-Ni-Cr alloys in EBR-II (Contribution to DAFS quarterly), 8:53929 (R;US)
Thermal Shock
Thermal-shock resistant alumina-metal cermet insulators, 8:54261 (J;US)

CHROMIUM-MOLYBDENUM STEELS
Eddy Current Testing
Eddy-current-inspection method for ferromagnetic transfer tubes: first report, 8:54545 (TJ;US)
Fatigue
Fatigue crack growth and fracture resistance of steels in high-pressure hydrogen environments. Final report, 8:54211 (R;XE)
Hydrogen Embrittlement
Comparison of the various test methods for studying the hydrogen sensitivity of steels used for storage and transport of hydrogen gas. Final report, June 1, 1980-November 30, 1982, 8:54246 (TG;US)
Fatigue crack growth and fracture resistance of steels in high-pressure hydrogen environments. Final report, 8:54211 (R;XE)
Welded Joints
Austenitic stainless steel-ferritic steel weld joint failures, 8:54245 (J;US)

CHROMODYNAMICS
See QUANTUM CHROMODYNAMICS

CITIES
See URBAN AREAS

CITRUS
Fertilizers
Olive and citrus tree crops and their fertilization in Greece: Field studies with ^{15}N labelled fertilizers, 8:54985 (RA;XA)

CIVIL DEFENSE
Some ecological contexts of attitudes concerning issues of civil defense. Final report, 8:55348 (R;US)
Evacuation
IDA/BPT crisis relocation planning model: description, documentation and user's guide to the computer program. Final report, 8:55345 (R;US)
Hardening
Industrial hardening: 1982 technical status report. Final report, 8:55347 (R;US)
Shelters
Research on upgrading structures for host and risk area shelters, phase II. Final report, 8:54373 (R;US)
USSR
Soviet crisis relocation program. Final report 1 May 82-Jun 83, 8:55346 (R;US)

CLADDING-FUEL INTERACTIONS
See FUEL-CLADDING INTERACTIONS

CLAYS
See also BENTONITE
Compressibility
Evaluation of clays and clay minerals for application to repository sealing, 8:53672 (R;US)
Evaluation
Evaluation of clays and clay minerals for application to repository sealing, 8:53672 (R;US)
Leaching
Thermodiffusional transport in pelagic clay: implications for nuclear waste disposal in geological media, 8:53683 (J;US)
Mechanical Properties
Evaluation of clays and clay minerals for application to repository sealing, 8:53672 (R;US)
Permeability
Evaluation of clays and clay minerals for application to repository sealing, 8:53672 (R;US)
Sorptive Properties
Evaluation of clays and clay minerals for application to repository sealing, 8:53672 (R;US)
Stability
Evaluation of clays and clay minerals for application to repository sealing, 8:53672 (R;US)

COAL
See also SUBBITUMINOUS COAL
Ashes
Examining relationships between coal characteristics and the performance of TVA power plants. Final report, 8:53861 (R;US)
Briquetting
Gasification of Simplex briquets: briquet production. Vol.1. Final report, 8:53346 (R;US)
Gasification of Simplex briquets: demonstration in the General Electric high-pressure gasifier. Vol.2. Final report, 8:53347 (R;US)

Calorific Value
Particle size effects in oxidation of pyrite in air/water chemical coal cleaning, 8:53415 (RA;US)
Chemical Composition
Examining relationships between coal characteristics and the performance of TVA power plants. Final report, 8:53861 (R;US)
Particle size effects in oxidation of pyrite in air/water chemical coal cleaning, 8:53415 (RA;US)
Cleaning
Coal preparation, 8:53419 (BA;US)
Engineering/economic analysis of coal preparation with flue gas desulfurization for keeping higher sulfur coals in the energy market, 8:53384 (R;US)
Physico-chemical fracturing and cleaning of coal, 8:53412 (R;US)
Combustion
Examining relationships between coal characteristics and the performance of TVA power plants. Final report, 8:53861 (R;US)
Sulfur oxides control burner. Final report Oct 79-Sep 81, 8:53420 (R;US)
Combustion Products
Kinds and quantities of organic combustion products in solid and liquid wastes from a coal-fired power station, 8:53393 (R;US)
Comparative Evaluations
Dependence of liquefaction behavior on coal characteristics. Part IV. Contributions to the understanding of the phenomenology of coal liquefaction. Final technical report, March 1981-February 1984, 8:53342 (R;US)
Computerized Tomography
Computed tomography of coals. Quarterly technical progress report No. 2, November 28, 1982-March 6, 1983, 8:53367 (R;US)
Consumption Rates
Florida statewide coal-conversion study: coal-supply and transportation analysis (Southeast USA), 8:53859 (R;US)
Depolymerization
Facile reaction/extraction of coal with supercritical fluids. Quarterly technical progress report, April 1, 1983-June 30, 1983, 8:53344 (R;US)
Desulfurization
Engineering/economic analysis of coal preparation with flue gas desulfurization for keeping higher sulfur coals in the energy market, 8:53384 (R;US)
Dissolution
Cooperative investigation by Auburn University and Cities Service Research and Development Company of combined coal and heavy-resid processing. Quarterly report, January 15, 1983-April 15, 1983, 8:53345 (R;US)
Facile reaction/extraction of coal with supercritical fluids. Quarterly technical progress report, April 1, 1983-June 30, 1983, 8:53344 (R;US)
Solvent tailoring in coal liquefaction. Quarterly report, February 1982-May 1982, 8:53340 (R;US)
Energy Supplies
Review of coal-supply models and forecasts: a critique of the current state-of-the-art, 8:54090 (R;US)
Exports
Influence of corporate strategy on the decision to proceed with district heating: case study of Toledo Edison Company, 8:54184 (R;US)
Fluidized-Bed Combustion
Design of advanced fossil-fuel systems (DAFFS). A study of three developing technologies for coal-fired, base-load electric power generation. Air-cooled pressurized fluidized-bed power plant, 8:53857 (R;US)
Design of advanced fossil-fuel systems (DAFFS). A study of three developing technologies for coal-fired, base-load electric power generation. Steam-cooled pressurized fluidized-bed power plant, 8:53856 (R;US)
Fourier Transformation
Chemistry and structure of coals: air oxidation studies related to fluidized bed combustion, 8:53373 (J;US)
Geothermometry
Effect of thermal alteration on petrographic constituents of the Hanna No. I coal, 8:53380 (J;US)
Grinding
Physico-chemical fracturing and cleaning of coal, 8:53412 (R;US)
Hydraulic Transport
Inland-transport modes for coal and coal-derived energy: an evaluation method for comparing environmental impacts, 8:53411 (R;US)
Land Transport
Inland-transport modes for coal and coal-derived energy: an evaluation method for comparing environmental impacts, 8:53411 (R;US)
Leaching
Physico-chemical fracturing and cleaning of coal, 8:53412 (R;US)
Losses
Coal preparation, 8:53419 (BA;US)
Maritime Transport
Area development plan for Radio Island, 8:54060 (R;US)
Mass Spectroscopy
Direct mass-spectrometric studies of the pyrolysis of carbonaceous fuels. II. Qualitative observations of primary and secondary processes in biomass, 8:53783 (J;NL)
Moisture
Examining relationships between coal characteristics and the performance of TVA power plants. Final report, 8:53861 (R;US)
Oxidation
Chemistry and structure of coals: air oxidation studies related to fluidized bed combustion, 8:53373 (J;US)
Petrography
Computed tomography of coals. Quarterly technical progress report No. 2, November 28, 1982-March 6, 1983, 8:53367 (R;US)
Dependence of liquefaction behavior on coal characteristics. Part IV. Contributions to the understanding of the phenomenology of coal liquefaction. Final technical report, March 1981-February 1984, 8:53342 (R;US)
Effect of thermal alteration on petrographic constituents of the Hanna No. I coal, 8:53380 (J;US)
Production
Coal supply and transportation model. Executive summary, 8:53413 (R;US)
Pyrolysis
Direct mass-spectrometric studies of the pyrolysis of carbonaceous fuels. II. Qualitative observations of primary and secondary processes in biomass, 8:53783 (J;NL)
Radioactivity
Radiological impact of the operation of coal-fired power stations within Australia, 8:53365 (RA;AU)
Rail Transport
Analysis of the impact of coal trains moving through Morehead City, North Carolina, 8:53398 (R;US)
Coal train movements through the city of Wilmington, North Carolina, 8:53397 (R;US)
Solvent Extraction
Effect of solvent pretreatment on coal liquefaction, 8:53361 (J;US)
Physico-chemical fracturing and cleaning of coal, 8:53412 (R;US)
Stockpiles
Application of a coal-pile drainage model to an industrial/institutional site, 8:53418 (R;US)
Storage
Application of a coal-pile drainage model to an industrial/institutional site, 8:53418 (R;US)
Structural Chemical Analysis
Computed tomography of coals. Quarterly technical progress report No. 2, November 28, 1982-March 6, 1983, 8:53367 (R;US)
Sulfur Content
Engineering/economic analysis of coal preparation with flue gas desulfurization for keeping higher sulfur coals in the energy market, 8:53384 (R;US)

Examining relationships between coal characteristics and the performance of TVA power plants. Final report, 8:53861 (R;US)
Transport
Coal preparation, 8:53419 (BA;US)
Coal supply and transportation model. Executive summary, 8:53413 (R;US)
Florida statewide coal-conversion study: coal-supply and transportation analysis (Southeast USA), 8:53859 (R;US)
COAL CHEMICALS
See COAL EXTRACTS
COAL DEPOSITS
See also COAL SEAMS
Drilling
Water jet drilling of long horizontal holes in coal beds, 8:53410 (BA;US)
Exploration
Surface mining environmental monitoring and reclamation handbook (Book), 8:53400 (R;US)
Geology
Surface mining environmental monitoring and reclamation handbook (Book), 8:53400 (R;US)
Mapping
Surface mining environmental monitoring and reclamation handbook (Book), 8:53400 (R;US)
Sampling
Surface mining environmental monitoring and reclamation handbook (Book), 8:53400 (R;US)
COAL EXTRACTS
Structural Chemical Analysis
Macromolecular structural changes in bituminous coals during extraction and solubilizatio. Final technical report, September 1, 1980-August 31, 1983, 8:53369 (R;US)
COAL GAS
Desulfurization
Development of a hot-gas-cleanup system for integrated coal-gasification/molten-carbonate fuel-cell power plants. Quarterly progress report, April-June 1983, 8:54115 (R;US)
Hot Gas Cleanup
Development of a hot-gas-cleanup system for integrated coal-gasification/molten-carbonate fuel-cell power plants. Quarterly progress report, April-June 1983, 8:54115 (R;US)
COAL GASIFICATION
See also BI-GAS PROCESS
CS-R PROCESS
EXXON GASIFICATION PROCESS
HYGAS PROCESS
LURGI PROCESS
PEATGAS PROCESS
WESTINGHOUSE GASIFICATION PROCESS
Assessment of ether and alcohol fuels from coal. Volume I. Summary. Final report, 8:53742 (R;US)
Catalysts
Study of the role of alkali metal salts as char gasification catalysts by Knudsen cell mass spectrometry, 8:53356 (J;US)
Chemical Reaction Kinetics
Transient kinetic studies of char reactions in a gradientless reactor system: CO_2 gasification, 8:53355 (J;US)
Chemical Reactors
Low temperature methane production by the catalyzed reaction of graphite and water vapor, 8:53358 (J;US)
Gasification
Transient kinetic studies of char reactions in a gradientless reactor system: CO_2 gasification, 8:53355 (J;US)
Hot Gas Cleanup
Experimental studies on the control of hydrocarbons emission from a gasifier. Final report, September 1981-February 1983, 8:53337 (R;US)
Measuring Instruments
Application of Kelgraph to electrochemical detectors for flow injection analysis and high performance liquid chromatography. Technical report, 8:54299 (R;US)
Meetings
Fundamentals of gas-carbon reactions; chemistry and characterization of coal macerals; general papers: coal to liquid products; general papers: chemistry and characterization of fossil fuels, 8:53354 (B;US)
Technology of preparation, combustion and commercial application of coal-water slurry fuels; shape selective catalysis and synthesis gas chemistry: routes to chemicals and fuels; general papers: combustion and coke; chemistry of combustion processes (abstracts only); pyrolysis processes and products from heavy feedstocks (abstracts only), 8:53422 (B;US)
Research Programs
Engineering-support services for the DOE/GRI coal-gasification research program. Monthly technical progress report, 27 February-26 March 1982, 8:53335 (R;US)
Waste Water
Application of Kelgraph to electrochemical detectors for flow injection analysis and high performance liquid chromatography. Technical report, 8:54299 (R;US)
COAL GASIFICATION PLANTS
Chemical Reactors
Modulated control system for improved regulation in on/off mode automatic controllers, 8:53363 (P;US)
Construction
Great Plains Gasification Associates. Quarterly technical and environmental report, Great Plains coal gasification project, Mercer County, North Dakota, second quarter, 1983, 8:53336 (R;US)
Control Systems
Modulated control system for improved regulation in on/off mode automatic controllers, 8:53363 (P;US)
Design
Great Plains Gasification Associates. Quarterly technical and environmental report, Great Plains coal gasification project, Mercer County, North Dakota, second quarter, 1983, 8:53336 (R;US)
Engineering
Great Plains Gasification Associates. Quarterly technical and environmental report, Great Plains coal gasification project, Mercer County, North Dakota, second quarter, 1983, 8:53336 (R;US)
Environmental Impacts
Fugitive emission testing at the Kosovo coal gasification plant. Final task report Apr 79-Sep 81 (Yugoslavia), 8:53349 (R;US)
Gaseous Wastes
Fugitive emission testing at the Kosovo coal gasification plant. Final task report Apr 79-Sep 81 (Yugoslavia), 8:53349 (R;US)
Leaks
Fugitive emission testing at the Kosovo coal gasification plant. Final task report Apr 79-Sep 81 (Yugoslavia), 8:53349 (R;US)
Level Indicators
Ash level meter for a fixed-bed coal gasifier, 8:53362 (P;US)
Packed Bed
Ash level meter for a fixed-bed coal gasifier, 8:53362 (P;US)
Pollution Control
Control technology appendices for pollution control technical manuals. Final report, June 1982-February 1983, 8:53389 (R;US)
Process Solutions
Differential optical absorption techniques for diagnostics of coal gasification. Technical progress report, April-June 1983, 8:53368 (R;US)
Waste Water
Identification and separation of the organic compounds in coal-gasification condensate waters, 8:53371 (R;US)
COAL INDUSTRY
Employment
Annual report and achievements 1976, 8:53407 (R;US)
COAL LIQUEFACTION
See also H-COAL PROCESS
Effect of solvent pretreatment on coal liquefaction, 8:53361 (J;US)
Catalysis
Hydrous metal oxide ion exchangers as hydrogenation catalysts for direct coal liquefaction, 8:53360 (J;US)
Catalysts
Cooperative investigation by Auburn University and Cities Service Research and Development Company of combined

coal and heavy-resid processing. Quarterly report, January 15, 1983-April 15, 1983, 8:53345 (R;US)
Dependence of liquefaction behavior on coal characteristics. Part IV. Contributions to the understanding of the phenomenology of coal liquefaction. Final technical report, March 1981-February 1984, 8:53342 (R;US)
Solvent tailoring in coal liquefaction. Quarterly report, November 1982-February 1983, 8:53341 (R;US)

Chemical Reaction Kinetics
Solvent tailoring in coal liquefaction. Quarterly report, November 1982-February 1983, 8:53341 (R;US)

Chemistry
Dependence of liquefaction behavior on coal characteristics. Part IV. Contributions to the understanding of the phenomenology of coal liquefaction. Final technical report, March 1981-February 1984, 8:53342 (R;US)
Facile reaction/extraction of coal with supercritical fluids. Quarterly technical progress report, April 1, 1983-June 30, 1983, 8:53344 (R;US)

Computerized Simulation
Solvent tailoring in coal liquefaction. Quarterly report, May 1982-August 1982, 8:53338 (R;US)

Meetings
Fundamentals of gas-carbon reactions; chemistry and characterization of coal macerals; general papers: coal to liquid products; general papers: chemistry and characterization of fossil fuels, 8:53354 (B;US)

Organic Solvents
Cooperative investigation by Auburn University and Cities Service Research and Development Company of combined coal and heavy-resid processing. Quarterly report, January 15, 1983-April 15, 1983, 8:53345 (R;US)
Improving the quality of deteriorated recycle solvents. Quarterly report, August 1982-November 1982, 8:53343 (R;US)
Solvent tailoring in coal liquefaction. Quarterly report, February 1982-May 1982, 8:53340 (R;US)
Solvent tailoring in coal liquefaction. Quarterly report, May 1982-August 1982, 8:53338 (R;US)

Research Programs
Cooperative investigation by Auburn University and Cities Service Research and Development Company of combined coal and heavy-resid processing. Quarterly report, January 15, 1983-April 15, 1983, 8:53345 (R;US)
Dependence of liquefaction behavior on coal characteristics. Part IV. Contributions to the understanding of the phenomenology of coal liquefaction. Final technical report, March 1981-February 1984, 8:53342 (R;US)
Direct hydrogenation and solvent extraction of coal (US DOE), 8:53334 (R;US)

Reviews
Dependence of liquefaction behavior on coal characteristics. Part IV. Contributions to the understanding of the phenomenology of coal liquefaction. Final technical report, March 1981-February 1984, 8:53342 (R;US)

Yields
Improving the quality of deteriorated recycle solvents. Quarterly report, August 1982-November 1982, 8:53343 (R;US)

COAL LIQUEFACTION PLANTS

Pollution Control
Control technology appendices for pollution control technical manuals. Final report, June 1982-February 1983, 8:53389 (R;US)

COAL LIQUIDS

Chemical Analysis
Analysis of lignite liquefaction products processed with syngas and hydrogen sulfide, 8:53381 (J;US)
System for analyzing coal-liquefaction products, 8:53382 (P;US)

Coking
Studies on aged H-Coal catalysts. Final report, 8:53350 (R;US)

Fractionation
Kinetics and mechanism of catalytic hydroprocessing of components of coal-derived liquids. Sixteenth quarterly report, February 16, 1983-May 15, 1983 (Functional group analysis of 10 fractions obtained which are, neutral oils, asphaltens, very weak bases, weak bases, strong bases, very weak acids, weak acids, strong acids, neutral resins and saturates), 8:53366 (R;US)

Hydrogenation
Solvent tailoring in coal liquefaction. Quarterly report, August 1982-November 1982, 8:53339 (R;US)
Studies on aged H-Coal catalysts. Final report, 8:53350 (R;US)

Infrared Spectra
Dependence of liquefaction behavior on coal characteristics. Part IV. Contributions to the understanding of the phenomenology of coal liquefaction. Final technical report, March 1981-February 1984, 8:53342 (R;US)

Monitoring
Analysis of lignite liquefaction products processed with syngas and hydrogen sulfide, 8:53381 (J;US)

Phase Studies
Phase equilibria for complex fluid mixtures, 8:53372 (R;US)

Recycling
Physical properties of SRC-I slurries under preheater conditions. Final report, 8:53348 (R;US)

Separation Processes
Improving the quality of deteriorated recycle solvents. Quarterly report, August 1982-November 1982, 8:53343 (R;US)

Solubility
Dependence of liquefaction behavior on coal characteristics. Part IV. Contributions to the understanding of the phenomenology of coal liquefaction. Final technical report, March 1981-February 1984, 8:53342 (R;US)

Structural Chemical Analysis
Kinetics and mechanism of catalytic hydroprocessing of components of coal-derived liquids. Sixteenth quarterly report, February 16, 1983-May 15, 1983 (Functional group analysis of 10 fractions obtained which are, neutral oils, asphaltens, very weak bases, weak bases, strong bases, very weak acids, weak acids, strong acids, neutral resins and saturates), 8:53366 (R;US)

Toxicity
Problems of toxicological testing of complex mixtures, 8:53424 (R;US)

COAL MINERS

Accidents
Annual report and achievements 1975, 8:53406 (R;US)
Annual report and achievements 1976, 8:53407 (R;US)
Annual report of the Secretary of Labor under the Federal Mine Safety and Health Act of 1977, fiscal year 1980. Volume 1, 8:53405 (R;US)
Annual report of the Secretary of Labor under the Federal Mine Safety and Health Act of 1977, fiscal year 1979. Volume 1, 8:53402 (R;US)

Injuries
Annual report and achievements 1975, 8:53406 (R;US)
Annual report and achievements 1976, 8:53407 (R;US)
Annual report and achievements 1977, 8:53409 (R;US)
Annual report of the Secretary of Labor under the Federal Mine Safety and Health Act of 1977, fiscal year 1980. Volume 1, 8:53405 (R;US)
Annual report of the Secretary of Labor under the Federal Mine Safety and Health Act of 1977, fiscal year 1979. Volume 1, 8:53402 (R;US)

Mortality
Appalachian coal miner mortality study: a 14-year follow-up, 8:53427 (R;US)

Occupational Diseases
Appalachian coal miner mortality study: a 14-year follow-up, 8:53427 (R;US)

Training
Annual report and achievements 1975, 8:53406 (R;US)
Annual report of the Secretary of Labor under the Federal Mine Safety and Health Act of 1977, fiscal year 1980. Volume 1, 8:53405 (R;US)
Annual report of the Secretary of Labor under the Federal Mine Safety and Health Act of 1977, fiscal year 1979. Volume 1, 8:53402 (R;US)

COAL MINES
Construction
Great Plains Gasification Associates. Quarterly technical and environmental report, Great Plains coal gasification project, Mercer County, North Dakota, second quarter, 1983, 8:53336 (R;US)
Size
Annual report and achievements 1976, 8:53407 (R;US)
COAL MINING
Health Hazards
Annual report and achievements 1977, 8:53409 (R;US)
Bureau of Mines coal mining, health and safety, research and development. 1975 annual report and achievements, 8:53404 (R;US)
Inspection
Annual report and achievements 1975, 8:53406 (R;US)
Overburden
Clay minerals in Northern Plains coal overburden as measured by X-ray diffraction, 8:54916 (J;US)
Regulations
Annual report and achievements 1975, 8:53406 (R;US)
Annual report and achievements 1976, 8:53407 (R;US)
Research Programs
Annual report of the Secretary of Labor under the Federal Mine Safety and Health Act of 1977, fiscal year 1979. Volume 2. Mining health and safety research and development (USA: cities and funding of health and safety research in progress), 8:53403 (R;US)
Bureau of Mines coal mining health and safety research and development. 1976 annual report and achievements (Includes data, organization and funding of current research programs), 8:53408 (R;US)
Safety Engineering
Annual report of the Secretary of Labor under the Federal Mine Safety and Health Act of 1977, fiscal year 1979. Volume 2. Mining health and safety research and development (USA: cities and funding of health and safety research in progress), 8:53403 (R;US)
Annual report and achievements 1977, 8:53409 (R;US)
Bureau of Mines coal mining, health and safety, research and development. 1975 annual report and achievements, 8:53404 (R;US)
Bureau of Mines coal mining health and safety research and development. 1976 annual report and achievements (Includes data, organization and funding of current research programs), 8:53408 (R;US)
Systems Analysis
Bureau of Mines coal mining health and safety research and development. 1976 annual report and achievements (Includes data, organization and funding of current research programs), 8:53408 (R;US)
COAL PREPARATION
Cyclone Separators
Coal preparation, 8:53419 (BA;US)
Economics
Coal preparation, 8:53419 (BA;US)
Heavy Media Separation
Coal preparation, 8:53419 (BA;US)
Jigs
Coal preparation, 8:53419 (BA;US)
Technology Assessment
Coal preparation, 8:53419 (BA;US)
COAL PREPARATION PLANTS
Flowsheets
Coal preparation, 8:53419 (BA;US)
Performance
Coal preparation, 8:53419 (BA;US)
Waste Water
Control of blackwater in coal preparation plant recycle and discharge. Open file report Oct 79-Sep 82 (final), 8:53390 (R;US)
COAL SEAMS
Chemical Composition
Data base for the analysis of compositional characteristics of coal seams and macerals. Quarterly technical progress report, May-July 1982 (USA), 8:53399 (R;US)
Degassing
Water jet drilling of long horizontal holes in coal beds, 8:53410 (BA;US)
Information Centers
Data base for the analysis of compositional characteristics of coal seams and macerals. Quarterly technical progress report, May-July 1982 (USA), 8:53399 (R;US)
Macerals
Data base for the analysis of compositional characteristics of coal seams and macerals. Quarterly technical progress report, May-July 1982 (USA), 8:53399 (R;US)
Petrography
Data base for the analysis of compositional characteristics of coal seams and macerals. Quarterly technical progress report, May-July 1982 (USA), 8:53399 (R;US)
Sampling
Data base for the analysis of compositional characteristics of coal seams and macerals. Quarterly technical progress report, May-July 1982 (USA), 8:53399 (R;US)
Variations
Data base for the analysis of compositional characteristics of coal seams and macerals. Quarterly technical progress report, May-July 1982 (USA), 8:53399 (R;US)
COAL-DERIVED LIQUIDS
See COAL LIQUIDS
COAL-FIRED MHD GENERATORS
See also MHD GENERATOR UTSI
Flow Models
MHD generator off-design performance and NO/sub x/ chemical-kinetics analysis, 8:54116 (R;US)
MHD Channels
1000-hour MHD anode test: executive summary, May-August 1981, 8:54114 (R;US)
COAL-OIL MIXTURES
See COAL FUEL SLURRIES
COASTAL REGIONS
Construction
Annotated bibliography on the biological effects of constructing channels, jetties, and other coastal structures. Miscellaneous report, 8:54939 (R;US)
COASTAL WATERS
Radioactivity
Th-230/Th-232 sedimentation rates and the natural radiation background along the western coast of Israel. Final report for the period 15 December 1977 - 31 October 1981, 8:54953 (R;XA)
COATED FUEL PARTICLES
Performance
Post-irradiation characterization and performance assessment of coated particle fuels, 8:53892 (BA;GB)
Post-Irradiation Examination
Post-irradiation characterization and performance assessment of coated particle fuels, 8:53892 (BA;GB)
COBALT
Activation Analysis
Elemental composition of human and animal milk. A review. A report prepared under the auspices of the IAEA in collaboration with the WHO, 8:54983 (R;XA)
Catalytic Effects
Cooperative investigation by Auburn University and Cities Service Research and Development Company of combined coal and heavy-resid processing. Quarterly report, January 15, 1983-April 15, 1983, 8:53345 (R;US)
Metal hydride catalysis: water formation on exposure of $LaCo_5H$/sub z/ to O_2, 8:54312 (J;US)
COBALT 60
Diffusion
Impurities diffusion in uranium: cobalt diffusion, 8:54212 (R;SU;In Russian)
COBALT COMPLEXES
Photochemical Reactions
Photochemistry of mixed-metal bimetalic complexes containing pentacyanoferrate(II) or pentaammineruthenium(II) metal centers. Evidence for some intramolecular energy-transfer reactions, 8:54340 (J;US)

Photochemistry
Photochemistry of mixed-metal bimetalic complexes containing pentacyanoferrate(II) or pentaammineruthenium(II) metal centers. Evidence for some intramolecular energy-transfer reactions, 8:54340 (J;US)
Visible Spectra
Photochemistry of mixed-metal bimetalic complexes containing pentacyanoferrate(II) or pentaammineruthenium(II) metal centers. Evidence for some intramolecular energy-transfer reactions, 8:54340 (J;US)

COBALT HYDRIDES
Oxidation
Metal hydride catalysis: water formation on exposure of $LaCo_5H$/sub z/ to O_2, 8:54312 (J;US)

COBALT OXIDES
Creep
Mechanisms of elevated-temperature rupture in single-phase ceramics. Progress report, February 1, 1983-January 31, 1984, 8:54254 (R;US)

COGENERATION
Prior to November 1980, this concept was indexed to CO-GENERATION.
See COGENERATION
Forecasting
Cogeneration and utility planning. Final report, 8:54187 (R;US)
Technology Assessment
Industrial and commercial cogeneration, 8:54171 (R;US)

COILS (MAGNETIC)
See MAGNET COILS

COINCIDENCE METHODS
Photoelectron Counting
Photoelectron-photon coincidences in anthracene crystals, 8:54674 (R;FR)

COKE OVENS
Waste Processing
Treatment of coke plant wastewaters in packed bed reactors, 8:53383 (R;US)

COKE-OVEN GAS
See COAL GAS

COKING
Meetings
Technology of preparation, combustion and commercial application of coal-water slurry fuels; shape selective catalysis and synthesis gas chemistry: routes to chemicals and fuels; general papers: combustion and coke; chemistry of combustion processes (abstracts only); pyrolysis processes and products from heavy feedstocks (abstracts only), 8:53422 (B;US)

COLLECTIVE ACCELERATORS
Beam Monitoring
Experimental determination of the nuclear reaction yield uses for beam diagnostics of the KUTI prototype, 8:54583 (R;SU;In Russian)

COLLIDING BEAMS
Calorimetric physics in the presence of multiple events, 8:54729 (RA;US)
Beam Bunching
Rates and time structure expected from $\sqrt{s} = 40$ TeV colliders, 8:54592 (RA;US)
Beam Luminosity
Rates and time structure expected from $\sqrt{s} = 40$ TeV colliders, 8:54592 (RA;US)
Drift Chambers
Tracking detectors, 8:54708 (RA;US)
Luminescent Chambers
Scintillation chamber of calorimeters for colliding beam detectors, 8:54715 (RA;US)
Radiation Detectors
Collider detectors: present capabilities and future possibilities, 8:54706 (R;US)
Shower Counters
Calorimetry at $L = 10^{33}$, 8:54720 (RA;US)

COLLIERIES
See COAL MINES

COLLIMATORS
Design
Variable aperture neutron collimator, 8:54626 (J;NL)

COLOGNE SPIRITS
See ETHANOL

COLORADO
Salt Deposits
Environmental characterization of bedded salt formations and overlying areas of the Permian Basin, 8:53689 (R;US)
Overview of the regional geology of the Paradox Basin Study Region, 8:53658 (R;US)

COLUMBIA RIVER
Radionuclide Migration
Plutonium and americium export to the north-east Pacific Ocean by Columbia River runoff, 8:54954 (J;GB)

COLUMBIUM
See NIOBIUM

COMBINED GAS AND STEAM CYCLE POWER PLANTS
See COMBINED-CYCLE POWER PLANTS

COMBINED STEAM-POWER GENERATION
See COGENERATION

COMBINED-CYCLE POWER PLANTS
Prior to March, 1976, the descriptors COMBINED CYCLES and FOSSIL-FUEL POWER PLANTS or THERMAL POWER PLANTS were used for indexing this concept.
Cost
Design of advanced fossil-fuel systems (DAFFS). A study of three developing technologies for coal-fired, base-load electric power generation. Air-cooled pressurized fluidized-bed power plant, 8:53857 (R;US)
Design of advanced fossil-fuel systems (DAFFS). A study of three developing technologies for coal-fired, base-load electric power generation. Steam-cooled pressurized fluidized-bed power plant, 8:53856 (R;US)
Design
Design of advanced fossil-fuel systems (DAFFS). A study of three developing technologies for coal-fired, base-load electric power generation. Air-cooled pressurized fluidized-bed power plant, 8:53857 (R;US)
Design of advanced fossil-fuel systems (DAFFS). A study of three developing technologies for coal-fired, base-load electric power generation. Steam-cooled pressurized fluidized-bed power plant, 8:53856 (R;US)
Engineering
Design of advanced fossil-fuel systems (DAFFS). A study of three developing technologies for coal-fired, base-load electric power generation. Air-cooled pressurized fluidized-bed power plant, 8:53857 (R;US)
Design of advanced fossil-fuel systems (DAFFS). A study of three developing technologies for coal-fired, base-load electric power generation. Steam-cooled pressurized fluidized-bed power plant, 8:53856 (R;US)
Fluidized-Bed Combustors
Design of advanced fossil-fuel systems (DAFFS). A study of three developing technologies for coal-fired, base-load electric power generation. Air-cooled pressurized fluidized-bed power plant, 8:53857 (R;US)
Design of advanced fossil-fuel systems (DAFFS). A study of three developing technologies for coal-fired, base-load electric power generation. Steam-cooled pressurized fluidized-bed power plant, 8:53856 (R;US)
Performance
Design of advanced fossil-fuel systems (DAFFS). A study of three developing technologies for coal-fired, base-load electric power generation. Air-cooled pressurized fluidized-bed power plant, 8:53857 (R;US)
Design of advanced fossil-fuel systems (DAFFS). A study of three developing technologies for coal-fired, base-load electric power generation. Steam-cooled pressurized fluidized-bed power plant, 8:53856 (R;US)

COMBUSTION
See also FLUIDIZED-BED COMBUSTION
IN-SITU COMBUSTION
SPONTANEOUS COMBUSTION
Activation Energy
Lectures on mathematical combustion. Lecture 1. Pre-asymptotic combustion revisited. Interim technical report, 8:54351 (R;US)

Computerized Simulation
Deflagration from an ignition site of a confined explosive charge as a function of venting by orifice flow, 8:54802 (RA;US)
Mathematical Models
Lectures on mathematical combustion. Lecture 1. Pre-asymptotic combustion revisited. Interim technical report, 8:54351 (R;US)
Lectures on mathematical combustion. Lecture 2. Governing equations, asymptotics, and deflagrations. Interim technical report, 8:54352 (R;US)
Lectures on mathematical combustion. Lecture 3. General deflagrations. Interim technical report, 8:54353 (R;US)
Lectures on mathematical combustion. Lecture 4. SVFS and NEFS. Interim technical report, 8:54354 (R;US)
Lectures on mathematical combustion. Lecture 5. Stability of the plane deflagration wave. Interim technical report, 8:54355 (R;US)
Lectures on mathematical combustion. Lecture 6. Cellular flames. Interim technical report, 8:54356 (R;US)
Lectures on mathematical combustion. Lecture 7. Pulsating flames. Interim technical report, 8:54357 (R;US)
Lectures on mathematical combustion. Lecture 8. Counterflow diffusion flames. Interim technical report, 8:54358 (R;US)
Lectures on mathematical combustion. Lecture 9. Spherical diffusion flames. Interim technical report, 8:54359 (R;US)
Lectures on mathematical combustion. Lecture 10. Free-boundary problems. Interim technical report, 8:54360 (R;US)

COMBUSTION KINETICS
Mathematical Models
Mechanism for the burning rate of high density, porous, energetic materials, 8:54803 (RA;US)
Role of gas phase reactions in deflagration-to-detonation transition, 8:54804 (RA;US)

COMBUSTORS
See also CYCLONE COMBUSTORS
FLUIDIZED-BED COMBUSTORS
Flow Models
Numerical investigation of recirculation in the UTSI MHD combustor, 8:54113 (R;US)

COMMERCIAL BUILDINGS
Energy Conservation
Proposed new energy standard for commercial buildings, 8:54144 (R;US)
Standards
Proposed new energy standard for commercial buildings, 8:54144 (R;US)

COMPONENT COOLING SYSTEMS
See AUXILIARY WATER SYSTEMS

COMPOUNDS (ORGANIC)
See ORGANIC COMPOUNDS

COMPRESSED AIR STORAGE POWER PLANTS
Feasibility Studies
Preliminary feasibility evaluation of compressed-air-storage power systems. Volume II. Appendices, period June 1975-December 1976, 8:54042 (R;US)

COMPRESSED GASES
Heating
Ignition of solid high explosive by the rapid compression of an adjacent gas layer, 8:54786 (RA;US)

COMPUTED TOMOGRAPHY
See COMPUTERIZED TOMOGRAPHY

COMPUTER CODES
Computer codes are indexed by their initial letter and CODES, e.g., A CODES. If the code name begins with a number the code is indexed to NUMBER CODES.
See also R CODES
SAFE users manual. Volume 4. Computer programs (Safeguards Automated Facility Evaluation (SAFE)), 8:53718 (R;US)
Benchmarks
Structural and thermal code evaluation, 8:54451 (RA;US)
D Codes
DRAMIN: transferring data from the Applicon graphic system to a DRAM input file. User guide, 8:55339 (R;US)
E Codes
Evacuation emergency response model coupling atmospheric release advisory capability output, 8:54037 (R;US)
F Codes
FACET: a radiation view factor computer code for axisymmetric, 2D planar, and 3D geometries with shadowing, 8:54525 (R;US)
FASTBUS Diagnostic Language users manual. Version 3(74), 8:55335 (R;US)
N Codes
Program for neutron group calculation of a plane periodical reactor cell using the difference analog of the surface pseudosource method NEGR-PR, 8:53917 (R;SU;In Russian)
P Codes
Monte Carlo calculations of initial energies of electrons in water irradiated by photons with energies up to 1 GeV (PHOEL-3 code), 8:55206 (J;GB)
PAFMOV: a PAFEC to MOVIE.BYU conversion, 8:55284 (R;US)
Using PAFEC as a preprocessor for COSMIC/NASTRAN, 8:55286 (R;US)
R Codes
Benchmarking of RADTRAN II, 8:53486 (RA;US)
S Codes
Two-dimensional analysis of joint and fault plane stability around a radioactive waste repository in bedded salt (SALTY), 8:53659 (R;US)

COMPUTER GRAPHICS
Manuals
Computerized art plotting system. Vol. I. Horizontal bar charts (second edition), 8:55341 (R;US)

COMPUTER LANGUAGES
See PROGRAMMING LANGUAGES

COMPUTER PROGRAMS
See COMPUTER CODES

COMPUTER-AIDED DESIGN
Computer Codes
DRAMIN: transferring data from the Applicon graphic system to a DRAM input file. User guide, 8:55339 (R;US)
Computer Graphics
DRAMIN: transferring data from the Applicon graphic system to a DRAM input file. User guide, 8:55339 (R;US)
Manufacturing
Computerized manufacturing: the impact of high technology implication for the work force, 8:55340 (R;US)
Uses
Computerized manufacturing: the impact of high technology implication for the work force, 8:55340 (R;US)

COMPUTERIZED TOMOGRAPHY
An imaging technique in which transmission measurements of a narrow beam of rays, photons, or particles made at several different angles around an object may be used with a computer program to obtain a clear image of one plane
Equipment
Computerized tomographic scanners, Veterans Administration, 8:54974 (R;US)

COMPUTERS
See also MICROPROCESSORS
Specifications
Minimal features of a computer and its basic software to execute NEPTUNIX 2 numerical step, 8:55329 (R;FR;In French)

CONCENTRATING COLLECTORS
Design
Solar collector, 8:53820 (P;FR;In French)

CONCENTRATIONS (RADIONUCLIDES)
See RADIOACTIVITY

CONCRETES
Cutting
Cutting concrete with abrasion jet, 8:53623 (RA;US)
Densimeters
Feasibility of development of a nuclear density gage for determining the density of plastic concrete at a particular stratum. Final report July 77-May 81, 8:54732 (R;US)
Density
Feasibility of development of a nuclear density gage for determining the density of plastic concrete at a particular stratum. Final report July 77-May 81, 8:54732 (R;US)

Repair
Magnesium-phosphate-glass cements with ceramic-type properties, 8:54284 (P;US)
Service Life
Durability of marker materials for nuclear waste isolation sites, 8:53670 (R;US)
CONDENSATES
Chemical Analysis
Identification and separation of the organic compounds in coal-gasification condensate waters, 8:53371 (R;US)
CONNECTIONS
See JOINTS
CONNECTORS
Design
Hermetically sealed microminiature multisocket connector, 8:54552 (R;US)
Performance Testing
Hermetically sealed microminiature multisocket connector, 8:54552 (R;US)
CONSERVATION (ENERGY)
See ENERGY CONSERVATION
CONTACT RADIOTHERAPY
See RADIOTHERAPY
CONTACTORS
See SWITCHES
CONTAINERS
See also CASKS
GAS CYLINDERS
PRESSURE VESSELS
Criticality
Nuclear criticality safety analysis of the Oak Ridge Y-12 plant birdcage-type containers for intraplant storage and transportation, 8:53548 (RA;US)
Design
Design and testing of a plutonium oxide transport container, 8:54395 (RA;US)
Development of waste package designs for disposal in a salt repository, 8:53639 (RA;US)
Development of a new DOT-7A, Type A corrugated metal waste container at the Rocky Flats Plant (For defense-generated TRU waste), 8:54398 (RA;US)
Large transport containers for nuclear reactor decommissioning waste, 8:54429 (RA;US)
Metal integrated container as part of an integrated system for back-end of irradiated fuel management, 8:53550 (RA;US)
Module container system for LAW disposal, 8:53636 (RA;US)
Transport containers for dangerous goods, 8:53745 (BA;DE;In German)
Failures
Protecting against failure by brittle fracture in ferritic steel shipping containers, 8:54378 (RA;US)
Fractures
Design criteria for nodular cast iron shipping containers, 8:54383 (RA;US)
Impact Tests
Experimental impact and puncture evaluation of the prototype quarter scale TRU transport package, 8:54424 (RA;US)
Non-shielded transport package impact response to unyielding and semi-yielding surfaces, 8:54426 (RA;US)
Leaks
Simple risk analysis tool for estimating release fractions from shipments of 55-gallon drums involved in transportation accidents, 8:53488 (RA;US)
Loading
Cargo-restraint-transporter (CRT): a proven method of handling drum-type containers on safe-secure trailers (SSTs), 8:53541 (RA;US)
Materials
Transport containers for dangerous goods, 8:53745 (BA;DE;In German)
Materials Testing
Assessment of cast irons for structural components in nuclear material transportation systems, 8:54384 (RA;US)
Design criteria for nodular cast iron shipping containers, 8:54383 (RA;US)
Long-term performance of materials used for high-level waste packaging. Quarterly report, April-June 1983, 8:53656 (R;US)
Mechanical requirements for materials of accident proof packagings of radioactive materials, 8:54380 (RA;US)
Mechanical Properties
Behaviour of UF_6 package in fire: comparison of calculations with experiment, 8:54415 (RA;US)
Mechanical requirements for materials of accident proof packagings of radioactive materials, 8:54380 (RA;US)
Performance Testing
Analysis of nuclear material shipping containers using a three-dimensional, dynamic finite element program, 8:54444 (RA;US)
Design and testing of a plutonium oxide transport container, 8:54395 (RA;US)
Facility for repeatable fire testing, 8:54439 (RA;US)
Risk Assessment
Simple risk analysis tool for estimating release fractions from shipments of 55-gallon drums involved in transportation accidents, 8:53488 (RA;US)
Safety Engineering
Transport containers for dangerous goods, 8:53745 (BA;DE;In German)
Thermodynamic Properties
Behaviour of UF_6 package in fire: comparison of calculations with experiment, 8:54415 (RA;US)
Three-Dimensional Calculations
Three-dimensional finite element analysis of radioactive material packagings, 8:54449 (RA;US)
Values
Transport containers for dangerous goods, 8:53745 (BA;DE;In German)
CONTAINMENT BUILDINGS
Studies on fluid impurities due to accidents in the containment of PWR reactors, 8:54023 (R;DE;In German)
Controlled Atmospheres
Application of the TEMPEST computer code for simulating hydrogen distribution in model containment structures (PWR; BWR), 8:54035 (R;US)
Seals
Potential for containment leak paths through electrical penetration assemblies under severe accident conditions (PWR;BWR), 8:54030 (R;US)
CONTAINMENT SHELLS
Leak Testing
Integrated leak rate test results of JOYO reactor containment vessel, 8:53975 (R;JP)
CONTAINMENT SYSTEMS
Controlled Atmospheres
Detonation of hydrogen-air mixtures (PWR;BWR), 8:54036 (R;US)
Depressurization
Thermohydraulics in a high-temperature gas-cooled reactor primary loop during early phases of unrestricted core-heatup accidents, 8:53985 (R;US)
Design
Design rules for containment systems of nuclear spent fuel and high-level waste transport packagings, 8:53570 (RA;US)
CONTAMINATION
Environmental Impacts
Detecting long-term ecological effects in forests and food chains, 8:54911 (R;US)
CONTAMINATION (INTERNAL)
See RADIONUCLIDE KINETICS
CONTINENTAL SHELF
Environmental Impacts
Diapir Field lease offering, June 1984, 8:53440 (R;US)
CONTROL ELEMENTS
See also SCRAM RODS
Materials Handling
Experience in BWR control rod shipping, 8:53893 (RA;US)
Transport
Experience in BWR control rod shipping, 8:53893 (RA;US)
CONTROL RODS
See CONTROL ELEMENTS

CONTROL ROOMS
Human Factors Engineering
Task analysis of nuclear-power-plant control-room crews: project approach methodology, 8:53944 (R;US)
CONTROL SYSTEMS
For automated processes including feedback.
See also REACTOR CONTROL SYSTEMS
Design
Applying process-control techniques to a research environment: on-line controls & instrumentation for Doublet III fusion project, 8:55292 (R;US)
Inspection
Energy monitoring and control systems inspection guidelines. Final report, 8:54124 (R;US)
CONTROL THEORY (REACTOR)
See REACTOR KINETICS
CONTROLLED ATMOSPHERES
Detonations
Detonation of hydrogen-air mixtures (PWR;BWR), 8:54036 (R;US)
CONVECTIVE LOOP HOUSES
See DOUBLE ENVELOPE BUILDINGS
CONVEYORS
See also BELT CONVEYORS
Decontamination
Los Alamos DP West Plutonium Facility decontamination project, 8:53613 (RA;US)
COOLANTS
See also specific coolant materials.
Boiling Detection
Current status on the development of sodium boiling detection system in Japan, 8:53946 (R;JP)
Simulation study of neutronic and acoustic methods of boiling detection, 8:53948 (R;JP)
Transmission experiment by the simulated LMFBR model and propagation analysis of acoustic signals, 8:53947 (R;JP)
Flow Rate
In-core flow measurement and calibration of gags using on-load instrumented stringers in a C.A.G.R. at Hinkley Point 'B', 8:53931 (R;XA)
Flowmeters
Development of a device to measure coolant flow within CAGR instrumented fuel stringers, 8:53894 (R;XA)
Temperature Measurement
Use of chromel-alumel thermocouples in high temperature experiments in WAGR, 8:53879 (R;XA)
Venturi Tubes
In-core flow measurement and calibration of gags using on-load instrumented stringers in a C.A.G.R. at Hinkley Point 'B', 8:53931 (R;XA)
COOLERS
See HEAT EXCHANGERS
COOLING SYSTEM (REACTOR)
See REACTOR COOLING SYSTEMS
COOLING TOWERS
Design
Vortex-augmented cooling tower - windmill combination, 8:53853 (P;US)
Water Treatment
Effectiveness of bromicide against Legionella pneumophila in a cooling tower, 8:55070 (R;US)
Wind Turbines
Vortex-augmented cooling tower - windmill combination, 8:53853 (P;US)
COORDINATED RESEARCH PROGRAMS
Research based on a common plan but carried out in various locations. To be used in coordination with institutions or countries involved.
Political Aspects
Political framework conditions of research and technology, 8:54071 (R;DE;In German)
Technology Assessment
Political framework conditions of research and technology, 8:54071 (R;DE;In German)
COPPER
Absorption Spectroscopy
Development of preconcentration techniques for the determination of cadmium, copper, lead and zinc in sea water in conjunction with flame atomic absorption spectrophotometry, 8:54298 (R;TH)
Activation Analysis
Elemental composition of human and animal milk. A review. A report prepared under the auspices of the IAEA in collaboration with the WHO, 8:54983 (R;XA)
Biological Accumulation
Trace metals in tropical river environment--speciation and biological transfer, 8:54946 (J;NL)
Ecological Concentration
Incidence of heavy metals in street surface sediments: solubility and grain size studies, 8:54917 (J;NL)
Trace metals in tropical river environment--speciation and biological transfer, 8:54946 (J;NL)
Materials Recovery
Characterization and processing of coal fired copper reverberatory flue dusts. Open file report 1 October 80-30 September 82, 8:54172 (R;US)
Proton Reactions
Deuteron production in proton-nucleus interactions at 7.5 GeV/c, 8:55183 (R;SU;In Russian)
Spectrophotometry
Development of preconcentration techniques for the determination of cadmium, copper, lead and zinc in sea water in conjunction with flame atomic absorption spectrophotometry, 8:54298 (R;TH)
COPPER 65 TARGET
Argon 40 Reactions
Calculation of fusion cross sections, 8:55175 (R;DD;In German)
Neon 22 Reactions
Calculation of fusion cross sections, 8:55175 (R;DD;In German)
Nitrogen 14 Reactions
Calculation of fusion cross sections, 8:55175 (R;DD;In German)
COPPER ALLOYS
See also COPPER BASE ALLOYS
Corrosion
Durability of marker materials for nuclear waste isolation sites, 8:53670 (R;US)
Microstructure
HVEM studies of precipitate morphology symmetries (Fe-Cu; Cu-Cr; Fe-N), 8:54225 (RA;US)
Service Life
Durability of marker materials for nuclear waste isolation sites, 8:53670 (R;US)
Weathering
Durability of marker materials for nuclear waste isolation sites, 8:53670 (R;US)
COPPER BASE ALLOYS
Microstructure
HVEM studies of precipitate morphology symmetries (Fe-Cu; Cu-Cr; Fe-N), 8:54225 (RA;US)
COPPER COMPOUNDS
Excitons
Measurement of high mobilities and strain confinement of long-lived free excitons in Cu20. Interim scientific report, 8:54252 (R;US)
CORE CATCHERS
Performance
Internal core catcher in Super Phenix, 8:53987 (R;FR)
CORES (REACTOR)
See REACTOR CORES
COSMIC MUONS
Prior to July, 1975 information was indexed to MUONS.
Multiplicity
Physics of multiple muons in underground detectors, 8:54654 (RA;US)
COSMIC NEUTRINOS
Prior to July, 1975 information was indexed to NEUTRINOS.
Energy Spectra
Other physics experiments at the Homestake Mine, 8:54653 (RA;US)

COSMIC RAY SPECTROMETERS
Shower Counters
Other physics experiments at the Homestake Mine, 8:54653 (RA;US)
COUNTERFLOW COOLING TOWERS
See COOLING TOWERS
COUNTERS (RADIATION)
See RADIATION DETECTORS
COUNTING TECHNIQUES
See also COINCIDENCE METHODS
FOUR-PI COUNTING
Algorithm for reconstruction of count-rate curves from total counts, 8:54291 (R;US)
COUNTY BUILDINGS
See PUBLIC BUILDINGS
COUPLED REACTOR CORES
Reactor Kinetics
Derivation of Pal-Bell equations for two-point reactors, and its application to correlation measurements at KUCA, 8:53919 (RA;JP;In Japanese)
COUPLINGS
Sealing coupling (LMFBR), 8:53905 (P;US)
Shape Memory Effect
Clamping force of heat-shrinkable fittings, 8:54368 (R;US)
Stresses
Clamping force of heat-shrinkable fittings, 8:54368 (R;US)
COURT BUILDINGS
See PUBLIC BUILDINGS
COW-MILKERS
See RADIOISOTOPE GENERATORS
CRACKS
Closures
Effects of crack closure on ultrasonic transmission, 8:54537 (R;US)
Ultrasonic Testing
Effects of crack closure on ultrasonic transmission, 8:54537 (R;US)
CRANES
Specifications
Safety engineering: KTA Code of Practice. Lifting mechanisms in nuclear plant, 8:53933 (TG;GB)
CRATERS
Relative apparent radii of craters in various soils, 8:54868 (R;US)
CREEKS
See STREAMS
CRITICALITY
Benchmarks
Standard problem exercise to validate criticality codes for spent LWR fuel transport container calculations, 8:54462 (RA;US)
CRITICALITY ACCIDENTS
See CRITICALITY
RADIATION ACCIDENTS
CROPS
Radioecological Concentration
The relative importance of uptake and surface adherence in determining the radionuclide contents of subterranean crops, 8:54929 (J;GB)
Radionuclide Kinetics
The relative importance of uptake and surface adherence in determining the radionuclide contents of subterranean crops, 8:54929 (J;GB)
CROSS SECTIONS
Benchmarks
Cross-section adjustment with Monte Carlo sensitivities: Application to the Winfrith iron benchmark, 8:53927 (J;US)
Monte Carlo Method
Cross-section adjustment with Monte Carlo sensitivities: Application to the Winfrith iron benchmark, 8:53927 (J;US)
CROSSED BEAMS
See COLLIDING BEAMS
CROSSFLOW COOLING TOWERS
See COOLING TOWERS
CROWN ETHERS
See POLYETHYLENE GLYCOLS
CRUDE OIL
See PETROLEUM
CRYSTAL GROWTH
Thermodynamic Model
Equilibrium shapes of crystals and of cavities in crystals, 8:54311 (J;US)
CRYSTAL STRUCTURE
Stability
Equilibrium shapes of crystals and of cavities in crystals, 8:54311 (J;US)
CS-R PROCESS
Monitoring
Engineering-support services for the DOE/GRI coal-gasification research program. Monthly technical progress report, 27 February-26 March 1982, 8:53335 (R;US)
Pilot Plants
Engineering-support services for the DOE/GRI coal-gasification research program. Monthly technical progress report, 27 February-26 March 1982, 8:53335 (R;US)
CURIUM
Radiochemical Analysis
Rapid method for the determination of americium-curium, plutonium and thorium in biological and environmental samples, 8:54349 (J;GB)
CURIUM 242
Energy Levels
Analysis of americium and curium resonance parameters, 8:55196 (R;SU;In Russian)
CURIUM 242 TARGET
Neutron Reactions
Analysis of americium and curium resonance parameters, 8:55196 (R;SU;In Russian)
CURIUM 243
Energy Levels
Analysis of americium and curium resonance parameters, 8:55196 (R;SU;In Russian)
CURIUM 243 TARGET
Neutron Reactions
Analysis of americium and curium resonance parameters, 8:55196 (R;SU;In Russian)
CURIUM 244
Energy Levels
Analysis of americium and curium resonance parameters, 8:55196 (R;SU;In Russian)
CURIUM 244 TARGET
Neutron Reactions
Analysis of americium and curium resonance parameters, 8:55196 (R;SU;In Russian)
CURIUM 245
Energy Levels
Analysis of americium and curium resonance parameters, 8:55196 (R;SU;In Russian)
CURIUM 245 TARGET
Neutron Reactions
Analysis of americium and curium resonance parameters, 8:55196 (R;SU;In Russian)
CURIUM 246
Energy Levels
Analysis of americium and curium resonance parameters, 8:55196 (R;SU;In Russian)
CURIUM 246 TARGET
Neutron Reactions
Analysis of americium and curium resonance parameters, 8:55196 (R;SU;In Russian)
CURIUM 247
Energy Levels
Analysis of americium and curium resonance parameters, 8:55196 (R;SU;In Russian)
CURIUM 247 TARGET
Neutron Reactions
Analysis of americium and curium resonance parameters, 8:55196 (R;SU;In Russian)
CURIUM 248
Energy Levels
Analysis of americium and curium resonance parameters, 8:55196 (R;SU;In Russian)

CURIUM 248 TARGET
Neutron Reactions
Analysis of americium and curium resonance parameters, 8:55196 (R;SU;In Russian)
CUTTING TOOLS
Arc saw and its application to decommissioning, 8:53621 (RA;US)
CYANOBACTERIA
Photosynthesis
Electron transfer around photosystem I in cyanobacterial heterocyst membranes, 8:54966 (R;US)
CYCLOALKENES
NMR Spectra
Carbon-13 magnetic resonance of hydroaromatics. 2. Conformation of tetralin and tetrahydroanthracene and their methyl derivatives, 8:54327 (J;US)
CYCLOHEXANE
Excitation
Activation of C-H bonds in saturated hydrocarbons on photolysis of (eta^5-C_5Me_5)(PMe_3)IrH_2. Relative rates of reaction of the intermediate with different types of C-H bonds and functionalization of the metal-bound alkyl groups, 8:54326 (J;US)
NMR Spectra
Activation of C-H bonds in saturated hydrocarbons on photolysis of (eta^5-C_5Me_5)(PMe_3)IrH_2. Relative rates of reaction of the intermediate with different types of C-H bonds and functionalization of the metal-bound alkyl groups, 8:54326 (J;US)
Solvent Properties
Effect of solvent pretreatment on coal liquefaction, 8:53361 (J;US)
CYCLONE COMBUSTORS
Design
Electrocyclone Development Program. Quarterly technical report, November-January 1982, 8:54557 (R;US)
Electrostatic Separation
Electrocyclone Development Program. Quarterly technical report, November-January 1982, 8:54557 (R;US)
Electrocyclone Development Program. Quarterly technical report, February-April 1982, 8:54558 (R;US)
Performance Testing
Electrocyclone Development Program. Quarterly technical report, February-April 1982, 8:54558 (R;US)
Testing
Electrocyclone Development Program. Quarterly technical report, November-January 1982, 8:54557 (R;US)
CYLINDERS
Objects of cylindrical shape. For containers see headings such as GAS CYLINDERS.
Design
Design of new overpacks for UF_6 cylinders, 8:54399 (RA;US)
CYLINDRICAL PARABOLIC COLLECTORS
See PARABOLIC TROUGH COLLECTORS

D

D PLUS RESONANCES
See D-1865 RESONANCES
D ZERO RESONANCES
See D-1865 RESONANCES
D* PLUS RESONANCES
See D-2007 RESONANCES
D* ZERO RESONANCES
See D-2007 RESONANCES
D-1865 RESONANCES
Weak Particle Decay
High-energy physics progress report, 1983-1984, 8:55138 (R;US)
D-2007 RESONANCES
Particle Production
Dsup(*+-) production by e^+e^- annihilation near 34.4 GeV C.M. energy, 8:55136 (R;DE)
DAMS
Feasibility Studies
Lock and Dam 7 Mississippi River near La Crosse, Wisconsin. Reconnaissance report for hydropower. Preliminary report, 8:53749 (R;US)
Lock and Dam 1, Mississippi River, Minneapolis - St. Paul, Minnesota. Reconnaissance report for hydropower. Preliminary report, 8:53751 (R;US)
Reconnaissance report for hydropower, Lock and Dam 8, Mississippi River. Preliminary report, 8:53748 (R;US)
Reconnaissance report for hydropower, Lock and Dam number 2, Mississippi River. Preliminary report, 8:53750 (R;US)
DARRIEUS ROTORS
Aerodynamics
Dynamic-stall regulation of the Darrieus turbine, 8:53852 (R;US)
DATA ACQUISITION SYSTEMS
Data Transmission
Participation of VAX VMS computers in IBM file-transfer networks, 8:55332 (R;US)
DATA ANALYSIS
Monte Carlo Method
Estimation of the ridge constant: an approach based on the condition index, 8:55333 (R;US)
DATA COVARIANCES
Data uncertainties
Bibliographies
Annotated bibliography covering generation and use of evaluated cross section uncertainty files, 8:55160 (R;US)
DATA PROCESSING
Manipulation of unit facts.
Programming Languages
ASSEMBLER program group for preliminary data processing on-line with ES-1010, 8:55337 (R;SU;In Russian)
DAYLIGHTING
Calculation Methods
Graphical method for determining interflected daylight in clear climates, 8:53758 (R;US)
DDT
Ecological Concentration
Polychlorinated biphenyls in the sediments of the Inner Oslofjord, 8:54947 (J;NL)
DECIDUOUS TREES
See TREES
DECOMMISSIONING
See also REACTOR DECOMMISSIONING
Cost
Decommissioning alternatives for Savannah River Plant high-level waste tank 16, 8:53631 (RA;US)
Decommissioning of independent spent fuel storage installations, 8:53633 (RA;US)
Status of decommissioning program of US Nuclear Regulatory Commission, 8:53608 (RA;US)
Cutting Tools
Arc saw and its application to decommissioning, 8:53621 (RA;US)
Evaluation
Evaluation of nuclear facility decommissioning projects program, 8:53634 (RA;US)
Low-Level Radioactive Wastes
Exemption of low-level decommissioning waste from controlled handling and disposal, 8:53626 (RA;US)
Manuals
Guide for radiological characterization and measurements for decommissioning of US Department of Energy surplus facilities, 8:53643 (R;US)
Meetings
1982 international decommissioning symposium, 8:53988 (R;US)
Planning
Decommissioning alternatives for Savannah River Plant high-level waste tank 16, 8:53631 (RA;US)
Status of decommissioning program of US Nuclear Regulatory Commission, 8:53608 (RA;US)

Quality Assurance
Quality assurance as a management tool in decommissioning activities, 8:53630 (RA;US)
Radiation Protection
Radiological planning and implementation for nuclear facility decommissioning, 8:53624 (RA;US)
Regulations
Status of decommissioning program of US Nuclear Regulatory Commission, 8:53608 (RA;US)
Risk Assessment
Aerosols from metal cutting techniques typical of decommissioning nuclear facilities - inhalation hazards and worker protection, 8:53690 (RA;US)
Aerosols from metal cutting techniques typical of decommissioning nuclear facilities - experimental system for collection and characterization, 8:53691 (RA;US)
Safety
Decommissioning of independent spent fuel storage installations, 8:53633 (RA;US)
Overview of decommissioning policy, standards and practices in NEA member countries, 8:53607 (RA;US)
Status of decommissioning program of US Nuclear Regulatory Commission, 8:53608 (RA;US)
Technology Assessment
Development of improved technology for decommissioning operations, 8:53620 (RA;US)

DECONTAMINATION
Radiation Monitoring
Radiation measurement capability for decontamination to unrestricted use, 8:53628 (RA;US)

DECONTAMINATION FACTOR
See DECONTAMINATION

DEEP INELASTIC HEAVY ION REACTIONS
Energy Losses
Nuclear beams and targets, 8:55198 (RA;XC)

DEFENSE ATOMIC SUPPORT AGENCY TRIGA-MK-F
See AFRRI REACTOR

DEFORMATION
Detection
Micrographic detection of plastic deformation in nickel-base alloys, 8:54544 (P;US)

DEGREE DAYS
Data Compilation
Commercial energy costs for SOLCOST data bank cities, Winter 1982-1983, 8:54105 (R;US)

DEHPA
See PHOSPHONIC ACID ESTERS

DEHUMIDIFIERS
Performance
Study and evaluation of the latent cooling potential of chemical de-humidifiers. Final report, 8:53803 (R;US)

DEHYDROGENASES
See OXIDOREDUCTASES

DENDRITES
Flow Models
Numerical solution to the Stokes equations for flow past two spheres and a chain of particles attached to a sphere, with an application to filter clogging, 8:55122 (R;US)

DENSIMETERS
Radiometric Gages
Feasibility of development of a nuclear density gage for determining the density of plastic concrete at a particular stratum. Final report July 77-May 81, 8:54732 (R;US)

DENSITOMETERS
Calibration
Evaluation and calibration of a Los Alamos National Laboratory L/sub III/-edge densitometer, 8:54731 (R;US)

DENSITY
For specific weight only.
Mathematical Models
Physical properties of SRC-I slurries under preheater conditions. Final report (300 to 728°K; 150, 1000, and 2500 psig), 8:53348 (R;US)

DENSITY (POPULATION)
See POPULATION DENSITY

DEOXYPENTOSE NUCLEIC ACID
See DNA

DEOXYRIBONUCLEIC ACID
See DNA

DEPOSITION
For the laying down of a substance on a surface; for deposition of elements and nuclides in tissues of living organisms use RETENTION.
Mathematical Models
Improved estimates of sulfate dry deposition in eastern North America, 8:54879 (R;US)

DEPRESSURIZATION SYSTEMS
Energy Recovery
Energy recovery from natural-gas pressure-regulator stations, 8:53446 (R;US)

DESERTS
Geochemistry
Nitrate distribution in Mojave Desert soils, 8:54914 (J;US)

DESOXYRIBONUCLEIC ACID
See DNA

DESULFURIZATION
Cost Benefit Analysis
Engineering/economic analysis of coal preparation with flue gas desulfurization for keeping higher sulfur coals in the energy market, 8:53384 (R;US)
Economics
SO_2 abatement for coal-fired boilers in Japan. Final report Jun 81-Jan 83, 8:54905 (R;US)
Technology Assessment
SO_2 abatement for coal-fired boilers in Japan. Final report Jun 81-Jan 83, 8:54905 (R;US)

DETECTION (FAILED ELEMENT)
See FAILED ELEMENT DETECTION

DETECTION (NUCLEAR EXPLOSIONS)
See NUCLEAR EXPLOSION DETECTION

DETECTION (RADIATION)
See RADIATION DETECTION

DETECTORS (RADIATION)
See RADIATION DETECTORS

DETONATION WAVES
Equations of Motion
Chapman-Jouguet detonation and its acceleration for a perfect fluid without conduction, 8:54832 (RA;US)
Streak Photography
Inverse multi-streak-technique, 8:54843 (RA;US)
Temperature Measurement
Brightness temperature of detonation wave in nitromethane-tetranitromethane mixtures and in gaseous mixtures at a high initial pressure, 8:54845 (RA;US)
Wave Propagation
Influence of the reaction zone on the state of detonation in a steady axial wave, 8:54834 (RA;US)

DETONATIONS
Meetings
Detonation. Proceedings, 8:54785 (R;US)
Temperature Dependence
Electron beam initiation of high explosives, 8:54791 (RA;US)

DETONATORS
Design
Mesh-initiated large area detonator with magnetic flux compression current generator as source, 8:54842 (RA;US)
Materials Testing
Exploding foil shock sensitivity test, 8:54856 (RA;US)
Performance Testing
Mesh-initiated large area detonator with magnetic flux compression current generator as source, 8:54842 (RA;US)

DETRITUS
Chemical Composition
The analytical pyrolysis of particulate residues of decomposing Myriophyllum heterophyllum, 8:54937 (J;NL)
Mass Spectroscopy
The analytical pyrolysis of particulate residues of decomposing Myriophyllum heterophyllum, 8:54937 (J;NL)

DEUTERIUM
Activation Analysis
Ion beam measurements of depth profiles of deuterium concentration in steels. Pt.1: investigation of 18Ni250 high temperature aged martensitic steel, 8:54301 (R;GB)

Ion beam measurements of depth profiles of deuterium concentration in steels. Pt.II: investigation of stainless steel types 304L and EN58E and conclusions of parts I and II, 8:54302 (R;GB)

Breakdown
Isotope dependence of the breakdown strength of gases, 8:55109 (R;US)

E1-Transitions
Photodisintegration of the deuteron, 1982, 8:55166 (R;US)

Isotope Effects
Nuclear magnetic resonance study of ethylenediaminetetrakis(methylenephosphonic acid) and some metal complexes, 8:54332 (J;US)
Quantum effects of high-frequency modes in inorganic electron transfer: kinetic isotope effects in redox reactions of $[Fe(H_2O)_6]^{2+}$, $[Fe(D_2O)_6]^{2+}$, and $Fe[(^{18}OH_2)_6]^{2+}$, 8:54310 (J;US)

Isotopic Exchange
Influences of macerals on the hydrogen-deuterium exchange reaction between tetralin and diphenylmethane, 8:53379 (J;US)
Nuclear magnetic resonance study of ethylenediaminetetrakis(methylenephosphonic acid) and some metal complexes, 8:54332 (J;US)

M1-Transitions
Photodisintegration of the deuteron, 1982, 8:55166 (R;US)

DEUTERIUM COMPOUNDS

Breakdown
Isotope dependence of the breakdown strength of gases, 8:55109 (R;US)

DEUTERIUM IONS

Penning Ion Sources
Low-pressure ion source, 8:55119 (P;US)

DEUTERIUM-LITHIUM HIGH FLUX NEUTRON SOURC
See NEUTRON SOURCE FACILITIES

DEUTERON REACTIONS

Inelastic Scattering
Inelastic scattering of 8.9 GeV/c deuterons on carbon, 8:55171 (R;SU)

Stripping
Study of the proton momentum spectrum from deuteron fragmentation at 8.9 GeV/c and an estimate of admixture parameters for the six-quark state in deuteron, 8:55170 (R;SU)

DEUTERON-DEUTERON INTERACTIONS
See DEUTERON REACTIONS

DEUTERONS

Particle Production
Deuteron production in proton-nucleus interactions at 7.5 GeV/c, 8:55183 (R;SU;In Russian)

DEVELOPING COUNTRIES
See also INDIA
REPUBLIC OF KOREA
SPAIN
TURKEY
YUGOSLAVIA

International Organizations
International developments on the sector of mineral raw material, 8:54067 (R;AT;In German)

DIAMOND DRILLING EQUIPMENT
See DRILLING EQUIPMENT

DIAMONDS

Electronic Structure
Electronic states of (2 x 1) and (1 x 1) (111) surfaces of Ge, Si diamond, GaAs and Ge on Si, 8:54286 (J;NL)

DIAPHRAGMS (THERMONUCLEAR DEVICE)
See LIMITERS

DIATOMS

Photosynthesis
Effects of continuous-background irradiance on xenon-flash-induced fluorescence yields in marine microalgae, 8:54967 (R;US)

DIAZO COMPOUNDS

Chemical Reactions
Rate constants for the decay and reactions of the lowest electronically excited singlet state of molecular oxygen in solution, 8:54343 (J;US)

DICHLORODIPHENYLTRICHLOROETHANE
See DDT

DIELECTRIC MATERIALS

Permittivity
Effects of dissipation in one-dimensional inverse problems, 8:55223 (R;US)

DIELECTRIC TRACK DETECTORS

Calibration
Calibration of a special emergency neutron dosemeter based on organic solid-state track detectors, 8:55214 (R;DD;In German)
Calibration of a special neutron dosemeter based on solid-state track detectors and fission radiators in various neutron fields, 8:54742 (R;DD;In German)

Electronic Circuits
Multi-channel spark counter for reading neutron dosemeters with plastic track detectors, 8:54744 (R;DD;In German)

Performance
Solid state track detection using CR-39, 8:54666 (RA;AU)

Readout Systems
Device for evaluating solid-state track detectors by means of light transmission measurements, 8:54737 (R;DD;In German)
Multi-channel spark counter for reading neutron dosemeters with plastic track detectors, 8:54744 (R;DD;In German)
Physical fundamentals for evaluating neutron-irradiated solid-state track detectors by light transmission measurements, 8:54736 (R;DD;In German)

Sensitivity
Model for calculating the neutron sensitivity of organic solid-state track detectors, 8:54745 (R;DD;In German)
Study of the properties of cellulose triacetate foils used as solid-state track detectors for neutrons, 8:54743 (R;DD;In German)

DIELECTRICS
See DIELECTRIC MATERIALS

DIESEL ENGINES

Air Pollution Abatement
Annual report of the Secretary of Labor under the Federal Mine Safety and Health Act of 1977, fiscal year 1979. Volume 2. Mining health and safety research and development, 8:53403 (R;US)
Review and assessment of reduced emissions/clean burning diesel engines for integration into the Army inventory. Final technical report, 8:54195 (R;US)

Explosives
Annual report of the Secretary of Labor under the Federal Mine Safety and Health Act of 1977, fiscal year 1979. Volume 2. Mining health and safety research and development, 8:53403 (R;US)

Fuel Substitution
Diesel-engine fumigation with aqueous ethanol, 8:54198 (R;US)

Hydrogen Fuels
Hydrogen engine induction technique for backfire-free operation. Contract research report Apr 81-May 82, 8:53738 (R;US)

Performance Testing
Improving the torque behaviour of exhaust gas-turbocharged vehicle diesel engines, 8:54199 (R;DE;In German)

Superchargers
Improving the torque behaviour of exhaust gas-turbocharged vehicle diesel engines, 8:54199 (R;DE;In German)

Systems Analysis
Improving the torque behaviour of exhaust gas-turbocharged vehicle diesel engines, 8:54199 (R;DE;In German)

Testing
Evaluation of four lubricants using a modified Federal Test Method 354 test procedure. Interim report August 80-December 80, 8:54194 (R;US)

DIET

Contamination
Strontium-90 and cesium-137 in total diet; April, 1978 to March, 1979. Radioactivity survey related with environmental and dietary materials, 8:54907 (RA;JP)

Radiation Monitoring
Strontium-90 and cesium-137 in total diet; April, 1978 to March, 1979. Radioactivity survey related with environmental and dietary materials, 8:54907 (RA;JP)
Radioactivity
Strontium-90 and cesium-137 in total diet; April, 1978 to March, 1979. Radioactivity survey related with environmental and dietary materials, 8:54907 (RA;JP)

DIETHYL ETHER
See ETHYL ETHER

DIFFERENTIAL EQUATIONS
Numerical Solution
Contribution to the minimization of time for the solution of algebraic differential equations system, 8:55230 (R;FR;In French)

DIFFRACTION (NEUTRON)
See NEUTRON DIFFRACTION

DIFFRACTION (X-RAY)
See X-RAY DIFFRACTION

DIFFUSION
Mathematical Models
Impact of New York state emission sources on Class 1 areas, 8:54894 (J;NL)

DIMETHYL KETONE
See ACETONE

2,2-DIMETHYLPROPANE
See 2-2-DIMETHYLPROPANE

2-2-DIMETHYLPROPANE
Excitation
Activation of C-H bonds in saturated hydrocarbons on photolysis of (eta^5-C_5Me_5)(PMe_3)IrH_2. Relative rates of reaction of the intermediate with different types of C-H bonds and functionalization of the metal-bound alkyl groups, 8:54326 (J;US)
NMR Spectra
Activation of C-H bonds in saturated hydrocarbons on photolysis of (eta^5-C_5Me_5)(PMe_3)IrH_2. Relative rates of reaction of the intermediate with different types of C-H bonds and functionalization of the metal-bound alkyl groups, 8:54326 (J;US)

DIODES (SEMICONDUCTOR)
See SEMICONDUCTOR DIODES

DIOLS
See GLYCOLS

DIPHENYLPHOSPHINE OXIDE
See ORGANIC PHOSPHORUS COMPOUNDS

DIRAC MONOPOLES
See MAGNETIC MONOPOLES

DIRECTIONAL DRILLING
Measuring Instruments
Wellbore inertial directional surveying system, 8:53436 (P;US)

DISCHARGES (WASTES)
See WASTE DISPOSAL

DISINFECTANTS
Biological Effects
Effectiveness of bromicide against Legionella pneumophila in a cooling tower, 8:55070 (R;US)

DISINTEGRATION (FISSION)
See FISSION

DISMANTLING (REACTOR)
See REACTOR DISMANTLING

DISPERSED STORAGE AND GENERATION
Circuit Breakers
TVA's dispersed generation protection requirements - what do they mean, 8:54104 (R;US)

DISPLACEMENT GAGES
Helium-Neon Lasers
Gauge block lasometer development, 8:54770 (R;US)
Interferometers
Gauge block lasometer development, 8:54770 (R;US)

DISPOSAL (WASTES)
See WASTE DISPOSAL

DISSOLVED OXYGEN
See OXYGEN

DISTRICT COOLING
District-heating handbook. Volume 1. A design guide (Book), 8:54190 (B;US)

DISTRICT HEATING
See also SOLAR DISTRICT HEATING
District-heating handbook. Volume 1. A design guide (Book), 8:54190 (B;US)
Decision Making
Influence of corporate strategy on the decision to proceed with district heating: case study of Toledo Edison Company, 8:54184 (R;US)
Energy Sources
Industrial waste heat for district heating, 8:54075 (J;US)

DIVERTORS
Plasma Drift
Task II: ECRH and transport modeling in tandem mirrors and divertor physics. Annual progress report on fusion plasma theory, January 1, 1983-December 31, 1983, 8:55241 (R;US)

DNA
Biological Repair
Estimating the carcinogenetic effects on humans of low doses of radiation or chemicals, 8:55066 (J;US)

DOLOMITE
Fluidized-Bed Combustion
Catalytic fluidized-bed combustion. Enhancement of sulfation of calcium oxide by iron oxide, 8:54367 (J;US)

DOPAMINE
Biochemical Reaction Kinetics
Measurements, in vivo, of parameters of the dopamine system, 8:54972 (R;US)

DORMITORIES
See RESIDENTIAL BUILDINGS

DOSE EQUIVALENTS
Multiplying factors used for the calculation of effective dose equivalent, 8:55209 (RA;AU)
Tissue to air ratios for open-cut uranium mine employees: a simulation using circular plane sources, 8:55000 (RA;AU)

DOSEMETERS
See also ALBEDO-NEUTRON DOSEMETERS
CALORIMETRIC DOSEMETERS
Calibration
Dissemination of survey meter calibrations, 8:54662 (RA;AU)

DOSIMETERS
See DOSEMETERS

DOUBLE ENVELOPE BUILDINGS
Large climate-moderating envelopes for enclosed structures. A preliminary evaluation of energy-conservation potential, 8:54138 (R;US)

DOUBLE SHELL HOUSES
See DOUBLE ENVELOPE BUILDINGS

DOUBLE WALL HOUSES
See DOUBLE ENVELOPE BUILDINGS

DOUBLET 3 DEVICES
See DOUBLET REACTORS

DOUBLET REACTORS
Control Systems
Applying process-control techniques to a research environment: on-line controls & instrumentation for Doublet III fusion project, 8:55292 (R;US)

DOUGLAS POINT ONTARIO REACTOR
For information indexed before 1976 CANDU REACTOR was used.
Reactor Decommissioning
Evaluation of immediate dismantlement of Candu reactors at the end of service life, 8:54007 (RA;US)
Reactor Dismantling
Evaluation of immediate dismantlement of Candu reactors at the end of service life, 8:54007 (RA;US)

DOUGLAS POINT POWER STATION
See DOUGLAS POINT ONTARIO REACTOR

DPO
See ORGANIC PHOSPHORUS COMPOUNDS

DRIFT CHAMBERS
Breakdown
Breakdown processes in wire chambers, prevention and rate capability, 8:54714 (RA;US)
LET
Study of fine dE/dX sampling with a longitudinal drift chamber, 8:54686 (R;JP)

Meetings
Tracking detectors, 8:54708 (RA;US)
Readout Systems
Electronic read-out system for the drift chambers of a neutrino calorimeter, 8:54679 (R;SU;In Russian)
DRIFT TUBES
Beam Focusing Magnets
Measuring system of multipole fields of the quadrupole magnet in drift-tubes of a linear accelerator, 8:54582 (R;JP)
Breakdown
Breakdown processes in wire chambers, prevention and rate capability, 8:54714 (RA;US)
Magnetic Fields
Measuring system of multipole fields of the quadrupole magnet in drift-tubes of a linear accelerator, 8:54582 (R;JP)
DRILL BITS
Wear
Development of turbodrill tachometer. Final report, 8:53430 (R;US)
DRILL SHIPS
See SHIPS
DRILLING EQUIPMENT
See also DRILL BITS
Seals
Program for the improvement of downhole drilling motor bearings and seals. Phase V. Final report, 8:53836 (R;US)
DRINKING WATER
Natural Radioactivity
Natural radioactivity in bottled mineral water, 8:54950 (RA;AU)
Radiation Monitoring
Strontium-90 and cesium-137 in service water; April, 1978 to September, 1978. Radioactivity survey related with environmental and dietary materials, 8:54935 (RA;JP)
Radioactivity
Strontium-90 and cesium-137 in service water; April, 1978 to September, 1978. Radioactivity survey related with environmental and dietary materials, 8:54935 (RA;JP)
DRY DEPOSITION
See DEPOSITION
DRY STORAGE
Dry storage of spent fuels. French experience, 8:53587 (BA;XN;In French)
Operating experience of cask-type dry storage and spent fuel performance, 8:53495 (RA;US)
Role of dry storage as a means to meet national storage needs in the United States, 8:53597 (BA;XN)
Spent fuel behavior in dry storage, 8:53590 (BA;XN)
Status of dry storage of irradiated fuel in Canada, 8:53595 (BA;XN)
TN 1300 transport/storage cask system, 8:53496 (RA;US)
Cooling Systems
Dry storage concepts and their thermodynamic layout, 8:53591 (BA;XN)
Cost
Technical and economic assessment of alternative dry storage methods, 8:53598 (BA;XN)
Economics
Technical and economic assessment of alternative dry storage methods, 8:53598 (BA;XN)
Feasibility Studies
Economical dry storage of large amounts of spent fuel and vitrified high level radioactive waste, 8:53599 (BA;XN)
Heat Transfer
Heat transfer in a dry horizontal spent LWR fuel assembly (experimental validation of the computer code RIGG), 8:53543 (RA;US)
Natural Convection
Dry storage concepts and their thermodynamic layout, 8:53591 (BA;XN)
Operation
Operating experience of vault type dry storage and its relevance to future storage needs, 8:53594 (BA;XN)
Performance
Operating experience of vault type dry storage and its relevance to future storage needs, 8:53594 (BA;XN)
Performance Testing
Dry storage instrumented bundle experiments, 8:53589 (BA;XN)
Planning
Planning and experience on the dry storage of Diorit spend fuel, 8:53493 (RA;US)
Spent Fuel Casks
Intermediate dry storage of the spent fuel of reactor DIORIT, 8:53593 (BA;XN)
Long-term dry storage demonstration with spent LWR fuel, 8:53583 (BA;XN)
MODREX: storage in concrete silos and/or iron casks, 8:53586 (BA;XN)
TN 1300 shipping/storage cask system for spent fuel, 8:53588 (BA;XN)
Storage Facilities
Construction of JRR-3 spent fuel dry storage facility, 8:53592 (BA;XN)
Technology Assessment
Technical and economic assessment of alternative dry storage methods, 8:53598 (BA;XN)
DRY-TYPE COOLING TOWERS
See COOLING TOWERS
DTO
See DEUTERIUM COMPOUNDS
DUBNA PULSED REACTOR
See IBR-2 REACTOR
DUBNA SYNCHROCYCLOTRON
Neutron Fluence
Determination of the secondary radiation field of the Dubna synchrocyclotron, 8:54623 (R;DD;In German)
Neutron Flux
Determination of the secondary radiation field of the Dubna synchrocyclotron, 8:54623 (R;DD;In German)
DUCTS
Radiation Streaming
Measurements of neutron and gamma ray streaming through a duct, (2), (3), 8:53976 (R;JP;In Japanese)
DUSTS
Radiation Monitoring
Strontium-90 and cesium-137 in air-borne dust; April, 1978 to September, 1978. Radioactivity survey related with environmental and dietary materials, 8:54875 (RA;JP)
Radioactivity
Strontium-90 and cesium-137 in air-borne dust; April, 1978 to September, 1978. Radioactivity survey related with environmental and dietary materials, 8:54875 (RA;JP)
DYMAC SYSTEM
See NUCLEAR MATERIALS MANAGEMENT PLUTONIUM
DYNAMIC MATERIALS ACCOUNTABILITY SYSTEM
See NUCLEAR MATERIALS MANAGEMENT PLUTONIUM
DYNAMITE
Fire Hazards
Thermal explosion hazard of thin layers of gelatine dynamite, 8:54790 (RA;US)
Packaging
Thermal explosion hazard of thin layers of gelatine dynamite, 8:54790 (RA;US)
Temperature Gradients
Thermal explosion hazard of thin layers of gelatine dynamite, 8:54790 (RA;US)

E

E LAYER
See E REGION
E REGION
Gravity Waves
Interaction between ionization and gravity waves in the upper atmosphere, 8:55101 (R;XA)

ECCS
Heat Transfer
Investigtion of the system behaviour of a pressurised-water reactor in loss-of-coolant accidents: the PKL experiment, 8:54040 (TJ;GB)
Hydraulics
Investigtion of the system behaviour of a pressurised-water reactor in loss-of-coolant accidents: the PKL experiment, 8:54040 (TJ;GB)
ECONOMIZERS
Size
Reclaiming lost capability in power plant coal conversions: an innovative, low-cost approach. Final report (Patented method of retrofitting coal boilers previously converted to oil or gas without derating), 8:53858 (R;US)
ECR HEATING
Culham ECRH, 8:55238 (RA;US)
ECRH transmission system, 8:55277 (RA;US)
ECRH transmission system, 8:55279 (RA;US)
Meetings
ECRH-transmission-system workshop, 8:55263 (R;US)
Microwave Equipment
Antennas and waveguides for electron-cyclotron heating of plasmas, 8:55260 (R;US)
Beam waveguide launcher for electron cyclotron resonance plasma heating, 8:55264 (RA;US)
Design of the 60 GH/sub z/ system, 8:55273 (RA;US)
EBT-S ECH transmission systems, 8:55269 (RA;US)
ECRH system at 28 GH/sub z/ on THOR tokamak, 8:55266 (RA;US)
MFTF-B quasi-control ECRH transmission system/waveguide transmission system for TMX-U, 8:55268 (RA;US)
Microwave transmission systems for the plasma separation process, 8:55267 (RA;US)
Waveguides
Summary of work by H.S. Yang and J.B. Beyer (Twist reflectors), 8:55265 (RA;US)
EFFLUENTS (LIQUID)
See LIQUID WASTES
EFFLUENTS (RADIOACTIVE)
See RADIOACTIVE EFFLUENTS
EFFUSION
See DIFFUSION
EFR REACTOR
See JOYO REACTOR
EHF RADIATION
See MICROWAVE RADIATION
EIIP
See ENERGY PARKS
ELASTOMERS
See also RUBBERS
Physical Radiation Effects
Radiation stability of plastics and rubbers, 8:54267 (R;GB)
ELECTRIC BATTERIES
Devices for production and/or storage of electrical energy from chemical reactions; excludes FUEL CELLS and RADIOISOTOPE BATTERIES.
See also LEAD-ACID BATTERIES
METAL-GAS BATTERIES
Industry
Development document for effluent limitations guidelines and standards for the battery manufacturing point source category, 8:54958 (R;US)
ELECTRIC CABLES
Electrical Insulation
TWIST: a computer program to calculate errors due to degradation of insulation resistance of mineral insulated thermocouple cables, 8:53930 (R;XA)
Technology Assessment
Hawaii Deep-Water Cable Program: electrical-grid-system integration investigations, 8:54093 (RA;US)
ELECTRIC CONTACTORS
See SWITCHES
ELECTRIC FIELDS
Biological Effects
Immunological and hematological effects of microwave power transmission from a satellite power system (Part 1 and Part 2). Final report, 8:55073 (R;US)
Computer Calculations
Efficient technique for calculating multiple solutions of electric-field problems. Part I. Final report, 8:55221 (R;US)
Efficient technique for calculating multiple solutions of electric-field problems. Part II. Corrections and modifications of the WINDOW program. Final report, 8:55222 (R;US)
Computerized Simulation
Efficient technique for calculating multiple solutions of electric-field problems. Part II. Corrections and modifications of the WINDOW program. Final report, 8:55222 (R;US)
ELECTRIC GENERATORS
Rotating generators only; excludes DIRECT ENERGY CONVERTERS.
See also INDUCTION GENERATORS
Cogeneration
Cogeneration project - Clark University. Integrated Community Energy System, 8:54186 (R;US)
Mathematical Models
Mathematical model for the doubly fed wound-rotor generator, 8:53847 (R;US)
ELECTRIC MOTORS
Control Equipment
Scheme of stepmotor control, 8:54762 (R;SU;In Russian)
Energy Efficiency
Benefits to industry of improved efficiency motors. Final report, 8:54165 (R;US)
ELECTRIC POWER
Cost
Commercial energy costs for SOLCOST data bank cities, Winter 1982-1983, 8:54105 (R;US)
Energy Conservation
Electricity's role in promoting conservation in Hawaii, 8:54092 (RA;US)
Prices
Spatial price duopoly under uniform delivered pricing, 8:54106 (J;GB)
Resource Conservation
Industrial electricity conservation potential in the Pacific Northwest. Final report. Volume II. Appendices, 8:54181 (R;US)
Industrial-electricity-conservation potential in the Pacific Northwest. Volume I. Final report, 8:54180 (R;US)
Supply and Demand
Generalized network flow model with application to power supply-demand problems, 8:54103 (R;US)
ELECTRIC POWER INDUSTRY
Federal Republic of Germany
VEBA-report on activities in 1980, 8:55326 (R;DE;In German)
ELECTRIC POWER SYSTEMS
See POWER SYSTEMS
ELECTRIC SWITCHES
See SWITCHES
ELECTRIC UTILITIES
Competition
Electric energy as a competitive business, 8:54094 (RA;US)
Data Compilation
Electric Power Monthly, 8:54096 (R;US)
Electric Power Quarterly, January-March 1983, 8:54097 (R;US)
Economics
Mathematical model of a utility firm. Final technical report, Part III, 8:54100 (R;US)
Federal Republic of Germany
VEBA-report on activities in 1980, 8:55326 (R;DE;In German)
Forecasting
Cogeneration and utility planning. Final report, 8:54187 (R;US)
Fossil Fuels
Cost and quality of fuels for electric utility plants: 1982 annual, 8:54095 (R;US)
Interconnected Power Systems
DVG report 1981, 8:54102 (R;DE;In German)
Organizational Models
Mathematical model of a utility firm. Final technical report, Part IIA, 8:54098 (R;US)

Mathematical model of a utility firm. Executive summary, 8:54099 (R;US)
Mathematical model of a utility firm. Final technical report, Part III, 8:54100 (R;US)
Mathematical model of a utility firm. Final technical report, Part I, 8:54073 (R;US)
Mathematical model of a utility firm. Final technical report, Part IIB, 8:54101 (R;US)
Planning
Mathematical model of a utility firm. Final technical report, Part IIB, 8:54101 (R;US)
Rate Structure
Commercial energy costs for SOLCOST data bank cities, Winter 1982-1983, 8:54105 (R;US)
Regulations
Electric energy as a competitive business, 8:54094 (RA;US)

ELECTRICAL INSULATORS
Thermal Shock
Thermal-shock resistant alumina-metal cermet insulators, 8:54261 (J;US)

ELECTRIC-POWERED VEHICLES
Comparative Evaluations
Study on a drive with synchronous engine for electric powered vehicles, 8:54200 (R;DE;In German)
Control Systems
Study on a drive with synchronous engine for electric powered vehicles, 8:54200 (R;DE;In German)
Evaluation
Electric-vehicle operations at the Hawaiian Telephone Company, 8:54151 (RA;US)
Historical Aspects
Electric-vehicle operations at the Hawaiian Telephone Company, 8:54151 (RA;US)
Simulation
Study on a drive with synchronous engine for electric powered vehicles, 8:54200 (R;DE;In German)

ELECTROCHEMICAL CELLS
See also ELECTRIC BATTERIES
FUEL CELLS
PHOTOELECTROCHEMICAL CELLS
Anodes
Parasitic corrosion-resistant anode for use in metal/air or metal/O_2 cells, 8:54052 (P;US)
Cathodes
Positive-electrode current collector for liquid-metal cells, 8:54051 (P;US)

ELECTRODES
See also ANODES
CATHODES
Performance Testing
1000-hour MHD anode test: executive summary, May-August 1981, 8:54114 (R;US)

ELECTROMAGNETIC PULSES
Computerized Simulation
Calculation of late-time surface burst EMP (electromagnetic pulse) fields using a time-independent numerical method. Master's thesis, 8:54755 (R;US)
Simulation
Techniques for source-region EMP experiments at AURORA. Contractor report, 8:54756 (R;US)
Simulators
Evaluation of AURORA as a tactical source region simulation. Contractor report, 8:54754 (R;US)

ELECTROMAGNETIC RADIATION
See also BREMSSTRAHLUNG
CHERENKOV RADIATION
ELECTROMAGNETIC PULSES
GAMMA RADIATION
LASER RADIATION
MICROWAVE RADIATION
ULTRAVIOLET RADIATION
X RADIATION
Transmission
Particle transfer in multiregion, 8:55204 (R;XA)

ELECTROMAGNETIC WAVES
See ELECTROMAGNETIC RADIATION

ELECTRON ACCEPTOR
See ELECTRONS

ELECTRON BEAMS
Beam Emittance
Variable-emittance filter for the Electron Laser Facility, 8:54594 (R;US)
Beam Transport
Extraction and propagation of an intense rotating electron beam, 8:54570 (R;US)
Beam-Plasma Systems
Plasma wave turbulence and particle heating caused by electron beams, radiation, and pinches. Annual interim report 1 Oct 81-30 Sep 82, 8:55097 (R;US)
Cherenkov Radiation
Cerenkov radiation. Master's thesis, 8:55201 (R;US)
Monochromators
Variable-emittance filter for the Electron Laser Facility, 8:54594 (R;US)

ELECTRON CHANNELING
On-Line Measurement Systems
Spectrometer for studying spontaneous radiation emitted during high-energy electron and positron channeling in monocrystals, 8:54704 (R;SU;In Russian)

ELECTRON COLLISIONS
See also ELECTRON-ION COLLISIONS
Sputtering
Electron scattering from silicon 30. Master's thesis, 8:54269 (R;US)

ELECTRON CYCLOTRON MASERS
See MICROWAVE AMPLIFIERS

ELECTRON CYCLOTRON-RESONANCE HEATING
See ECR HEATING

ELECTRON DETECTION
Fabrication
High resolution position detecting system with a SWPC for electron spectroscopy, 8:54685 (R;JP)
Proportional Counters
High resolution position detecting system with a SWPC for electron spectroscopy, 8:54685 (R;JP)
Shower Counters
Test of a flash chamber calorimeter as a nucleon decay detector, 8:54657 (RA;US)
Si Semiconductor Detectors
Use of solid state detectors for spectrometry of conversion electrons emitted in the decay of lead-210, 8:54667 (RA;AU)
Surface Barrier Detectors
Use of solid state detectors for spectrometry of conversion electrons emitted in the decay of lead-210, 8:54667 (RA;AU)

ELECTRON DONOR
See ELECTRONS

ELECTRON MICROSCOPES
Brakes
Braking system, 8:54485 (P;US)

ELECTRON MICROSCOPY
See also TRANSMISSION ELECTRON MICROSCOPY
Meetings
Proceedings of the seventh international conference on high voltage electron microscopy, 8:54766 (R;US)
Recording Systems
Dynamic recording system for HVEM in situ studies, 8:54767 (RA;US)

ELECTRON RINGS
Loss Cone
Classical theory of the bumpy torus relativistic annulus, 8:55317 (J;AT)
Polarized Beams
Alternative longitudinal polarization scheme for tristan, 8:54643 (R;JP)

ELECTRON SPECTROMETERS
Si Semiconductor Detectors
Use of solid state detectors for spectrometry of conversion electrons emitted in the decay of lead-210, 8:54667 (RA;AU)
Surface Barrier Detectors
Use of solid state detectors for spectrometry of conversion electrons emitted in the decay of lead-210, 8:54667 (RA;AU)

ELECTRONIC DATA PROCESSING
See DATA PROCESSING

ELECTRONIC EQUIPMENT
See also AMPLIFIERS
FUNCTION GENERATORS
MICROWAVE EQUIPMENT
POWER SUPPLIES
SCALERS
Physical and computer modeling of military earth grounding practices in a HEMP (high-altitude electromagnetic pulse) environment. Technical memo, 8:54757 (R;US)
Manufacturing
Industrial process profiles for environmental use: Chapter 30. The electronic component manufacturing industry. Final report, 8:54960 (R;US)
ELECTRON-ION COLLISIONS
Electron-ion collisions (Basic physics of inelastic processes of excitation, ionization, and recombination), 8:55239 (R;US)
ELECTRON-POSITRON INTERACTIONS
Annihilation
P-odd effects for the one-photon mechanism of three-jet e^+e^- -> qanti q + π^{+-} processes, 8:55153 (TJ;DE)
Inclusive Interactions
Dsup(*+-) production by e^+e^- annihilation near 34.4 GeV C.M. energy, 8:55136 (R;DE)
Jet Model
P-odd effects for the one-photon mechanism of three-jet e^+e^- -> qanti q + π^{+-} processes, 8:55153 (TJ;DE)
Particle Production
Dsup(*+-) production by e^+e^- annihilation near 34.4 GeV C.M. energy, 8:55136 (R;DE)
ELECTRONS
Energy Levels
Monte Carlo calculations of initial energies of electrons in water irradiated by photons with energies up to 1 GeV (PHOEL-3 code), 8:55206 (J;GB)
ELECTROSTATIC WAVES
See PLASMA WAVES
ELECTROSTATICS
Electric Fields
Efficient technique for calculating multiple solutions of electric-field problems. Part I. Final report, 8:55221 (R;US)
ELLIPSOMETERS
Design
Fast, self-nulling spectroscopic ellipsometer: instrumentation and application. Revision, 8:54765 (R;US)
ELMO BUMPY TORUS
Electron Rings
Classical theory of the bumpy torus relativistic annulus, 8:55317 (J;AT)
Microwave Equipment
EBT-S ECH transmission systems, 8:55269 (RA;US)
Plasma Instability
Effect of magnetic bending on the high-frequency stability of the ELMO Bumpy Torus, 8:55240 (R;US)
EMBRYOS
Internal Irradiation
Sensitivity of early mouse embryos to [^{3}H]thymidine, 8:55060 (J;US)
Radiosensitivity
Sensitivity of early mouse embryos to [^{3}H]thymidine, 8:55060 (J;US)
EMERGENCY CORE COOLING SYSTEM
See ECCS
EMERGENCY PLANS
Manuals
Energy emergency handbook, 8:54055 (R;US)
EMERGENCY RODS
See SCRAM RODS
EMISSION SPECTROSCOPY
Sample Preparation
Direct liquid sample introduction into an inductively coupled argon plasma, 8:54293 (R;US)
EMP
See ELECTROMAGNETIC PULSES
EMPLOYEES
See PERSONNEL
END USE SECTOR
See INDUSTRY
TRANSPORTATION SECTOR
ENDF
See NUCLEAR DATA COLLECTIONS
ENERGY
See also NUCLEAR ENERGY
SOLAR ENERGY
Information Dissemination
Energy for Illinois. Final report, 8:54192 (R;US)
Technology Transfer
Energygrams: brief descriptions of energy technology, 8:55343 (R;US)
ENERGY AUDITS
Volunteers for Energy Conservation. Final report, 8:54193 (R;US)
ENERGY BALANCE
Calculation Methods
Energy balance of buildings, 8:54140 (R;DE;In German)
ENERGY COMPLEXES
See ENERGY PARKS
ENERGY CONSERVATION
Building Codes
Equivalency methodology: issues, findings, and recommendations, 8:54137 (R;US)
Constraints
Energy and other resource conservation within urbanizing areas, 8:54176 (J;US)
Economics
Energy-conservation programs: Building Dept., Building Dept., City and County of Honolulu, 8:54179 (RA;US)
Educational Tools
Energy-conservation programs: County of Maui, 8:54191 (RA;US)
Energy Policy
Governor's energy conference - Hawaii's energy options for the 80s, 8:54053 (R;US)
Hawaii's energy options for the 80's, 8:54078 (RA;US)
Engineering
Proper engineering for energy conservation, 8:54132 (RA;US)
Environmental Effects
Sampling strategies for indoor radon investigations, 8:54897 (RA;US)
Government Policies
Conservation of energy resources, 8:54147 (B;US)
Implementation
How to organize an energy-conservation program for new and existing buildings, 8:54133 (RA;US)
Information Dissemination
Energy for Illinois. Final report, 8:54192 (R;US)
Volunteers for Energy Conservation. Final report, 8:54193 (R;US)
Meetings
Conservation of energy resources, 8:54147 (B;US)
National Program Plans
Federal conservation programs in the 80's, 8:54076 (RA;US)
Planning
How to organize an energy-conservation program for new and existing buildings, 8:54133 (RA;US)
Program Management
Energy-conservation programs: Building Dept., Building Dept., City and County of Honolulu, 8:54179 (RA;US)
Project to analyze the potential energy and cost savings of changes in the DHHS: minimum requirements of construction and equipment for hospital and medical facilities, 8:54136 (R;US)
Tax Credits
Tax credits claimed by Hawaii residents, 8:53762 (RA;US)
ENERGY CONSUMPTION
See also FUEL CONSUMPTION
Forecasting
'Modal Splits' for safeguarding Switzerland's energy supply until the year 2000, 8:54056 (R;CH;In German)
NEPP-IV: DOE's Fourth Biennial National Energy Policy Plan, 8:54089 (J;US)
Statistical Data
State Energy Overview (Contains glossary), 8:54080 (R;US)
ENERGY CONVERSION
See also SOLAR ENERGY CONVERSION

Forecasting
NEPP-IV: DOE's Fourth Biennial National Energy Policy Plan, 8:54089 (J;US)

ENERGY DEMAND
Economic Elasticity
Global aspects of energy supply and demand, 8:54079 (RA;US)
Forecasting
Alternative energy demand futures to 2010, 8:54081 (R;US)
U.S. energy supply prospects to 2010, 8:54082 (R;US)
Global Aspects
Global aspects of energy supply and demand, 8:54079 (RA;US)
Statistical Data
State Energy Overview (Contains glossary), 8:54080 (R;US)

ENERGY EFFICIENCY
Government Policies
Energy-conservation programs, State Department of Transportation, 8:54150 (RA;US)
Standards
Massachusetts Home Energy Rating System Project, 8:54143 (R;US)

ENERGY FACILITIES
See also RESOURCE RECOVERY FACILITIES
Feasibility Studies
Validation of the Cumberland Energyplex concept. Volume 3. Appendixes. Final report, 8:54163 (R;US)
Validation of the Cumberland Energyplex concept. Volumes 1 and 2. Executive summary and analysis detail. Final report, 8:54164 (R;US)

ENERGY INTEGRATED INDUSTRIAL PARKS
See ENERGY PARKS

ENERGY MANAGEMENT
Grants
Energy management in a health-care institute, 8:54131 (RA;US)

ENERGY MANAGEMENT SYSTEMS
Inspection
Energy monitoring and control systems inspection guidelines. Final report, 8:54124 (R;US)

ENERGY PARKS
Feasibility Studies
Validation of the Cumberland Energyplex concept. Volumes 1 and 2. Executive summary and analysis detail. Final report, 8:54164 (R;US)

ENERGY POLICY
See also NATIONAL ENERGY PLAN
Conservation of energy resources, 8:54147 (B;US)
Mathematical Models
DAMOS: a data and modelling system for energy policy analysis, 8:54083 (R;US)
Personnel
Program for developing professional capabilities in energy-conservation policy analysis. Final report, September 1979-December 1980, 8:54054 (R;US)

ENERGY SHORTAGES
Emergency Plans
Energy emergency handbook, 8:54055 (R;US)

ENERGY SOURCE DEVELOPMENT
Environmental Impacts
CEREAS: an interactive computer-mapping system for environmental assessments, 8:53439 (R;US)
National Environmental Research Areas: FOCI for integrated research in western energy resource regions. A feasibility study report, 8:53394 (R;US)
Forecasting
NEPP-IV: DOE's Fourth Biennial National Energy Policy Plan, 8:54089 (J;US)
Information Systems
CEREAS: an interactive computer-mapping system for environmental assessments, 8:53439 (R;US)
Research Programs
National Environmental Research Areas: FOCI for integrated research in western energy resource regions. A feasibility study report, 8:53394 (R;US)

ENERGY SOURCES
See also FOSSIL FUELS
NUCLEAR FUELS
RENEWABLE ENERGY SOURCES
Energy Policy
Governor's energy conference - Hawaii's energy options for the 80s, 8:54053 (R;US)
Hawaii's energy options for the 80's, 8:54078 (RA;US)

ENERGY SUPPLIES
Economic Elasticity
Global aspects of energy supply and demand, 8:54079 (RA;US)
Forecasting
Coal supply and transportation model. Executive summary, 8:53413 (R;US)
Review of coal-supply models and forecasts: a critique of the current state-of-the-art, 8:54090 (R;US)
Global Aspects
Global aspects of energy supply and demand, 8:54079 (RA;US)
Mathematical Models
'Modal Splits' for safeguarding Switzerland's energy supply until the year 2000, 8:54056 (R;CH;In German)

ENERGY TRANSMISSION
See ENERGY TRANSPORT

ENERGY TRANSPORT
Environmental Impacts
Inland-transport modes for coal and coal-derived energy: an evaluation method for comparing environmental impacts, 8:53411 (R;US)

ENGLAND
See UNITED KINGDOM

ENTOMOLOGY
See INSECTS

ENVELOPE HOUSES
See DOUBLE ENVELOPE BUILDINGS

ENVIRONMENT
Background Radiation
Measurement of environmental radioactivity in Toki district, 8:54690 (R;JP;In Japanese)
Radionuclide Migration
Levels of strontium 90 in the environment at PINSTECH (Period 1979-1980), 8:54927 (R;PK)
Natural radioactivity in the production of titanium dioxide pigment: a study of the Laporte plant and environmental behaviour of radionuclides at Bunbury, Western Australia, 8:54921 (RA;AU)

ENVIRONMENTAL EFFECTS
This descriptor is to be used only when the actual effects on the environment are discussed.
Monitoring
Surface mining environmental monitoring and reclamation handbook (Book), 8:53400 (R;US)

ENVIRONMENTAL IMPACTS
This descriptor is to be used to describe the possible effects on the environment from a proposed project.
Mapping
CEREAS: an interactive computer-mapping system for environmental assessments, 8:53439 (R;US)
Monitoring
Detecting long-term ecological effects in forests and food chains, 8:54911 (R;US)

ENVIRONMENTAL PARKS
See NATURE RESERVES

ENVIRONMENTAL POLICY
Ecological Research Division Marine Research Program, 8:54951 (R;US)
NO/sub x/ information book (Contains glossary), 8:54903 (R;US)

ENVIRONMENTAL PROTECTION AGENCY
See US EPA

ENZYME INHIBITORS
Peptides
Isolation of an active site peptide from spinach ribulose bisphosphate carboxylase/oxygenase modified by glyoxylate, 8:54962 (R;US)

EPA
See US EPA

EPIDEMIOLOGY
Epidemiology applied to health physics, 8:55003 (R;US)
Methodologic assessment of radiation epidemiology studies, 8:55006 (RA;US)

Data Acquisition Systems
Computerized micrographics in processing hard-copy records for an epidemiologic study, 8:55022 (RA;US)
Standard procedures for pooling health physics data for epidemiologic studies, 8:55020 (RA;US)
Data Covariances
Improvement in radiation exposure measurements at Rocky Flats over the past 30 years and its possible impact on epidemiological studies, 8:54922 (RA;US)
Errors
Considerations in using radiation dosimetry data in epidemiologic studies, 8:55018 (RA;US)
Reviews
Epidemiological methods: a brief review, 8:55005 (RA;US)
Statistics
Note on homogeneity tests when combining 2 x 2 tables, 8:54982 (R;US)
EQUATIONS (DIFFERENTIAL)
See DIFFERENTIAL EQUATIONS
ERBIUM OXIDES
Electric Conductivity
Electrical conductivities of polycrystalline and single-crystal Er_2O_3-stabilized hafnia, 8:54256 (R;US)
ESTUARIES
Radionuclide Migration
Plutonium, cesium, uranium, and thorium series radionuclides in the Hudson River estuary and other environments. Annual technical progress report, December 1, 1982-November 30, 1983, 8:54952 (R;US)
ESTUARINE ECOSYSTEMS
See AQUATIC ECOSYSTEMS
1,2-ETHANEDIOL
See GLYCOLS
ETHANOL
Biosynthesis
Ethanol production by Zymomonas mobilis, 8:53741 (R;US)
Separation Processes
Evaluation of nondistillation ethanol-separation processes, 8:53744 (R;US)
Water Removal
Evaluation of nondistillation ethanol-separation processes, 8:53744 (R;US)
ETHANOL FUELS
Use for pure ethanol, ethanol-water mixtures, or ethanol with additives; for ethanol-gasoline mixtures, use GASOHOL.
Diesel-engine fumigation with aqueous ethanol, 8:54198 (R;US)
Feasibility Studies
Brewing industry potential for the immediate and near-term production of fuel-grade ethyl alcohol. Final report, 8:53743 (R;US)
ETHANOL PLANTS
Retrofitting
Brewing industry potential for the immediate and near-term production of fuel-grade ethyl alcohol. Final report, 8:53743 (R;US)
ETHER
See ETHYL ETHER
ETHERS
See also ETHYL ETHER
Chemical Bonds
Dependence of liquefaction behavior on coal characteristics. Part IV. Contributions to the understanding of the phenomenology of coal liquefaction. Final technical report, March 1981-February 1984, 8:53342 (R;US)
Facile reaction/extraction of coal with supercritical fluids. Quarterly technical progress report, April 1, 1983-June 30, 1983, 8:53344 (R;US)
Chemical Reactions
Facile reaction/extraction of coal with supercritical fluids. Quarterly technical progress report, April 1, 1983-June 30, 1983, 8:53344 (R;US)
Ionic hydrogen bond. 2. Intramolecular and partial bonds. Protonation of polyethers, crown ethers, and diketones, 8:54321 (J;US)
Hydrogenation
Facile reaction/extraction of coal with supercritical fluids. Quarterly technical progress report, April 1, 1983-June 30, 1983, 8:53344 (R;US)
Ionic hydrogen bond. 2. Intramolecular and partial bonds. Protonation of polyethers, crown ethers, and diketones, 8:54321 (J;US)
Mixtures
Assessment of ether and alcohol fuels from coal. Volume I. Summary. Final report, 8:53742 (R;US)
NMR Spectra
Cross polarization and magic angle sample spinning NMR spectra of model organic compounds. 1. Highly protonated molecules, 8:54334 (J;US)
Spin-Lattice Relaxation
Cross polarization and magic angle sample spinning NMR spectra of model organic compounds. 1. Highly protonated molecules, 8:54334 (J;US)
Structural Chemical Analysis
Ionic hydrogen bond. 2. Intramolecular and partial bonds. Protonation of polyethers, crown ethers, and diketones, 8:54321 (J;US)
Synthesis
Assessment of ether and alcohol fuels from coal. Volume I. Summary. Final report, 8:53742 (R;US)
ETHINE
See ACETYLENE
ETHOCEL
See CELLULOSE ETHERS
ETHYL ALCOHOL
See ETHANOL
ETHYL ETHER
Chemical Reactions
Kinetics and mechanism of the oxidation of hexaaquovanadium(II) ions by aliphatic radicals, 8:54314 (J;US)
ETHYL RADICALS
Chemical Reaction Yield
Shock-tube study of propane pyrolysis. Rate of initial dissociation from 1400 to 2300 K, 8:54366 (J;US)
ETHYLENE
Combustion Products
Study of factors affecting soot formation in a swirl-stabilized combustor. Final report 22 Jan 80-30 Sep 82, 8:53443 (R;US)
ETHYLENE GLYCOL
See GLYCOLS
ETHYLENE POLYMERS
See POLYETHYLENES
ETHYNE
See ACETYLENE
EUCALYPTUSES
Biomass Plantations
Eucalyptus plantations for energy production in Hawaii, 8:53766 (RA;US)
EUROPE
See also WESTERN EUROPE
Research Programs
Free electron laser research in Europe. Technical report, 8:54502 (R;US)
EUROPEAN COMMUNITIES
Reactor Decommissioning
Overview of decommissioning research and development activities in the European Community, 8:53997 (RA;US)
EUROPIUM HYDRIDES
Magnetic Susceptibility
Structure and magnetism of Eu_2IrD_5, 8:54241 (J;US)
Structural Chemical Analysis
Structure and magnetism of Eu_2IrD_5, 8:54241 (J;US)
EVACUATED TUBE COLLECTORS
Performance Testing
Steam-generating collectors, 8:53815 (R;US)
Steam Generation
Steam-generating collectors, 8:53815 (R;US)

Thermal Conduction
Heat conduction in rarefied gases between concentric cylinders: arbitrary accommodation on both surfaces, 8:53816 (RA;US)

EVALUATED NUCLEAR DATA FILE
See NUCLEAR DATA COLLECTIONS

EXCHANGE (HEAT)
See HEAT TRANSFER

EXCITONS
Decay
Exciton-laser amplifier. Interim technical report, 8:54508 (R;US)

EXPERIMENTAL FACILITIES (ACCELERATOR)
See ACCELERATOR FACILITIES

EXPLOSIONS
See also CHEMICAL EXPLOSIONS
NUCLEAR EXPLOSIONS
UNDERGROUND EXPLOSIONS
Hearings
Annual report and achievements 1976 (Scotia mines, Ovenfork, KY), 8:53407 (R;US)

EXPLOSIVE FRACTURING
Blast Effects
Surface mining environmental monitoring and reclamation handbook (Book), 8:53400 (R;US)
Fracture Mechanics
Mechanics of fracture under high-rate stress loading, 8:55081 (R;US)
Monitoring
Surface mining environmental monitoring and reclamation handbook (Book), 8:53400 (R;US)

EXPOSURE (RADIATION DOSES)
See RADIATION DOSES

EXTRACTION (BEAM)
See BEAM EXTRACTION

EXTREMELY HIGH FREQUENCY RADIATION
See MICROWAVE RADIATION

EXXON GASIFICATION PROCESS
Monitoring
Engineering-support services for the DOE/GRI coal-gasification research program. Monthly technical progress report, 27 February-26 March 1982, 8:53335 (R;US)
Process Development Units
Engineering-support services for the DOE/GRI coal-gasification research program. Monthly technical progress report, 27 February-26 March 1982, 8:53335 (R;US)

F

F REGION
Gravity Waves
Interaction between ionization and gravity waves in the upper atmosphere, 8:55101 (R;XA)

FABRY-PEROT INTERFEROMETER
Refractivity
Ultrasensitive optical rotation and refractive-index measurements, 8:54294 (R;US)

FACILITIES (ACCELERATOR)
See ACCELERATOR FACILITIES

FACILITIES (ENERGY)
See ENERGY FACILITIES

FACILITIES (MILITARY)
See MILITARY FACILITIES

FACILITIES (NUCLEAR)
See NUCLEAR FACILITIES

FACILITIES (RESOURCE RECOVERY)
See RESOURCE RECOVERY FACILITIES

FACILITIES (STORAGE)
See STORAGE FACILITIES

FACILITIES (TERMINAL)
See TERMINAL FACILITIES

FACILITIES (TEST)
See TEST FACILITIES

FAILED ELEMENT DETECTION
Optimization
Fuel failure detection and location methods in CAGRs, 8:53889 (R;XA)
Research Programs
Current status of Japanese research and development activity and program plan on failed fuel detection and location systems for LMFBR, 8:53900 (R;JP)

FAILED ELEMENT MONITORS
Studies on modeling to failed fuel detection system response in LMFBR, 8:53977 (R;JP)

FALLOUT
For radioactive fallout only.
Radiation Monitoring
Environmental radiation monitoring, 8:54896 (RA;AU)
Strontium-90 and cesium-137 in rain and dry fallout; April, 1978 to December, 1978. Radioactivity survey related with environmental and dietary materials, 8:54874 (RA;JP)
Radioactivity
Strontium-90 and cesium-137 in rain and dry fallout; April, 1978 to December, 1978. Radioactivity survey related with environmental and dietary materials, 8:54874 (RA;JP)

FALLOUT PARTICULATES
See FALLOUT
PARTICLES

FAST BREEDER TYPE REACTORS
See FBR TYPE REACTORS

FAST EXPERIMENTAL BREEDER REACTOR JAPAN
See JOYO REACTOR

FAST NEUTRONS
Attenuation
Measurements of neutron and gamma ray streaming through a duct, (2), (3), 8:53976 (R;JP;In Japanese)
Neutron Spectra
Model for calculating the neutron sensitivity of organic solid-state track detectors, 8:54745 (R;DD;In German)

FAST REACTORS
See also FBR TYPE REACTORS
IBR-2 REACTOR
YAYOI REACTOR
Fuel Assemblies
Experimental investigation of local hydrodynamic characteristics of the peripheral area of a fast reactor fuel assembly. 2. Results of measurements at rated geometry, 8:53903 (R;CS;In Russian)
Reactor Kinetics
Adaptation of the NF-6 complex programs to the ARAMAKO constants, 8:53896 (R;SU;In Russian)

FASTBUS SYSTEM
Control Systems
VIRTUS: a multi-processor event selector using FASTBUS, 8:54730 (RA;US)
Diagnostic Techniques
FASTBUS diagnostic language. Reference manual for the Unibus process interface, Version 1A(15), 8:55334 (R;US)
FASTBUS Diagnostic Language users manual. Version 3(74), 8:55335 (R;US)

FAST-MIXED SPECTRUM REACTOR
See FBR TYPE REACTORS

FATIGUE
Cracks
Effects of crack closure on ultrasonic transmission, 8:54537 (R;US)

FATTY ACIDS
See CARBOXYLIC ACIDS

FBR TYPE REACTORS
See also JOYO REACTOR
LMFBR TYPE REACTORS
Coolants
Simulation study of neutronic and acoustic methods of boiling detection, 8:53948 (R;JP)
Reactor Kinetics
Combined method of elements in solving the gas kinetic equation of neutron transport, 8:53898 (R;SU;In Russian)

FDR REACTOR
See OTTO HAHN REACTOR

FEDAL
See FAILED ELEMENT DETECTION
FEDERAL GOVERNMENT
See NATIONAL GOVERNMENT
FEDERAL REGION I
Prior to June 1982 this concept was indexed to NORTH ATLANTIC REGION.
Air Pollution
Effects of varying air trajectories on spatial and temporal precipitation chemistry patterns, 8:54895 (J;NL)
FEDERAL REGION V
Prior to June 1982 this concept was indexed to GREAT LAKES REGION.
See also ILLINOIS
Climates
Response of the North American corn belt to climatic warming, CO_2, 8:54881 (R;US)
Crops
Response of the North American corn belt to climatic warming, CO_2, 8:54881 (R;US)
FEDERAL REGION VII
Prior to June 1982 this concept was indexed to MIDWEST REGION.
See also IOWA
KANSAS
Climates
Response of the North American corn belt to climatic warming, CO_2, 8:54881 (R;US)
Crops
Response of the North American corn belt to climatic warming, CO_2, 8:54881 (R;US)
FEDERAL REGION VIII
Prior to June 1982 this concept was indexed to ROCKY MOUNTAIN REGION.
See also COLORADO
NORTH DAKOTA
UTAH
Coal Mining
Clay minerals in Northern Plains coal overburden as measured by X-ray diffraction, 8:54916 (J;US)
FEDERAL REGION X
Prior to June 1982 this concept was indexed to PACIFIC NORTHWEST REGION.
See also OREGON
Electric Power
Industrial-electricity-conservation potential in the Pacific Northwest. Volume I. Final report, 8:54180 (R;US)
FEDERAL REPUBLIC OF GERMANY
Away-From-Reactor Storage
Long-term dry storage demonstration with spent LWR fuel, 8:53583 (BA;XN)
Coordinated Research Programs
Political framework conditions of research and technology, 8:54071 (R;DE;In German)
Dry Storage
Dry storage concepts and their thermodynamic layout, 8:53591 (BA;XN)
Long-term dry storage demonstration with spent LWR fuel, 8:53583 (BA;XN)
Planning and experience on the dry storage of Diorit spend fuel, 8:53493 (RA;US)
Qualification and certification criteria of casks for the intermediate dry storage of spent fuel in the Federal Republic of Germany, 8:54385 (RA;US)
Electric Utilities
DVG report 1981, 8:54102 (R;DE;In German)
PWR Type Reactors
PWR nuclear power stations in the German Federal Republic: operating experience with pressurized-water plants, 8:53877 (TJ;GB)
Reactor Decommissioning
Plans and activities for decommissioning of LWR power plants by the German utilities, 8:54003 (RA;US)
Reactor Safety
List of reports concerning reactor safety research from BMFT, CEA, EPRI, JSTA, and USNRC, 8:54024 (R;DE;In German)
Solar Radiation
Studies on parameterization of global, diffuse and direct solar radiation. Final report, 8:53757 (R;US)
Transport Regulations
Transport and storage of RAM: the role of BAM, 8:53510 (RA;US)
Underground Mining
1980 annual report of the Bavarian Mines Inspectorate, 8:53401 (R;DE;In German)
FEED MATERIALS PLANTS
Decommissioning
Characterization of nuclear fuel cycle facilities requiring decommissioning and decontamination, 8:53632 (RA;US)
Decontamination
Characterization of nuclear fuel cycle facilities requiring decommissioning and decontamination, 8:53632 (RA;US)
Health Hazards
Mortality patterns among a retrospective cohort of uranium mill workers, 8:55031 (RA;US)
FERMENTATION
Research Programs
Liquid-fuel research in Hawaii, 8:53768 (RA;US)
FERMENTATION ALCOHOL
See ETHANOL
FERMI FLUID
See FERMI GAS
FERMI GAS
Specific Heat
Specific heat of ^3He in the Fermi-liquid region, 8:54764 (R;US)
FERMI LIQUID
See FERMI GAS
FERMI-DIRAC GAS
See FERMI GAS
FERMILAB ACCELERATOR
Facility at Fermi National Accelerator Laboratory, Batavia, Illinois, includes main synchroton, booster synchrotron, and linac.
Research Programs
Fermilab fixed target program and schedule, 8:55130 (RA;XC)
FERRIC COMPOUNDS
See IRON COMPOUNDS
FERRITIC STEELS
Fracture Mechanics
Application of linear-elastic fracture mechanics concepts to ferritic spent fuel shipping casks, 8:54379 (RA;US)
Fracture Properties
Protecting against failure by brittle fracture in ferritic steel shipping containers, 8:54378 (RA;US)
FERROMAGNETIC MATERIALS
Eddy Current Testing
Eddy-current-inspection method for ferromagnetic transfer tubes: first report, 8:54545 (TJ;US)
FERROUS COMPOUNDS
See IRON COMPOUNDS
FERTILIZERS
Environmental Transport
Agrochemicals: fate in food and the environment. Proceedings of an international symposium on agrochemicals: fate in food and the environment using isotope techniques, jointly organized by the IAEA and the FAO and held in Rome, 7-11 June 1982, 8:54997 (B;XA;FR)
Research Programs
Fertilizer use efficiency, 8:54988 (RA;XA)
FIELD EFFECT TRANSISTORS
Physical Radiation Effects
Total-dose radiation-effects data for semiconductor devices. Vol. 1, 8:54759 (R;US)
FIELDS (ELECTRIC)
See ELECTRIC FIELDS
FIELDS (MAGNETIC)
See MAGNETIC FIELDS
FINGERPRINTING (OIL SPILLS)
See OIL SPILLS
FIRE STATIONS
See PUBLIC BUILDINGS

FIREDAMP
See METHANE
FIRES
Detection
Annual report of the Secretary of Labor under the Federal Mine Safety and Health Act of 1977, fiscal year 1979. Volume 2. Mining health and safety research and development, 8:53403 (R;US)
Fire Fighting
Annual report of the Secretary of Labor under the Federal Mine Safety and Health Act of 1977, fiscal year 1979. Volume 2. Mining health and safety research and development, 8:53403 (R;US)
FIRST WALL
Activity Levels
Potential low-level waste disposal limits for activation products from fusion, 8:53677 (R;US)
Radioactivation
Disposal of activated fusion wall materials, 8:53727 (R;US)
FISCHER-TROPSCH SYNTHESIS
Catalysts
Effects of potassium promotion on the activity and selectivity of iron Fischer-Tropsch catalysts, 8:54319 (J;US)
Chemical Analysis
Stirred autoclave apparatus for study of the Fischer-Tropsch synthesis in a slurry bed. 2. Analytical procedures, 8:54316 (J;US)
FISHES
Animal Growth
Aquaculture report 1976, 8:53839 (R;US)
Impingement
Impingement of threadfin shad: effects of temperature and hydrography, 8:53862 (J;US)
Radioactivity
Preliminary investigation of radiation level and some radionuclides in imported food and food products, 8:54295 (R;TH)
Radiometric Analysis
Preliminary investigation of radiation level and some radionuclides in imported food and food products, 8:54295 (R;TH)
FISHING INDUSTRY
Energy Consumption
Reduction of energy needs for fish harvesting through the use of sails on fishing vessels, 8:54173 (R;US)
FISSILE MATERIALS
Criticality
Criticality aspects of the transport of fissile materials, 8:53561 (RA;US)
Criticality safety analysis of transport packages for fissile materials and transport index evaluation, 8:54458 (RA;US)
Nondestructive Analysis
Method and apparatus for measuring reactivity of fissile material, 8:53722 (P;US)
Transport
Criticality aspects of the transport of fissile materials, 8:53561 (RA;US)
FISSION
Fokker-Planck Equation
Use of a transport equation for the dynamical behaviour of the nuclear fission, 8:55197 (R;FR)
FISSION CHAMBERS
Performance
Wide range in-core neutron measurement system used in the Windscale AGR concluding experiments, 8:53882 (R;XA)
FISSION FRAGMENT SPECTROMETERS
Design
Time-of-flight mass spectrometer, 8:54780 (P;US)
FISSIONABLE MATERIALS MANAGEMENT
See NUCLEAR MATERIALS MANAGEMENT
FIXATION (WASTE TREATMENT)
See SOLIDIFICATION
FIXED BED
See PACKED BED
FLAME SPECTROMETRY
See EMISSION SPECTROSCOPY
FLAMES
Lectures on mathematical combustion. Lecture 8. Counterflow diffusion flames. Interim technical report, 8:54358 (R;US)
Lectures on mathematical combustion. Lecture 9. Spherical diffusion flames. Interim technical report, 8:54359 (R;US)
Hydrodynamics
Lectures on mathematical combustion. Lecture 4. SVFS and NEFS. Interim technical report, 8:54354 (R;US)
Stability
Lectures on mathematical combustion. Lecture 6. Cellular flames. Interim technical report, 8:54356 (R;US)
Lectures on mathematical combustion. Lecture 7. Pulsating flames. Interim technical report, 8:54357 (R;US)
FLASKS
See CASKS
FLAT PLATE COLLECTORS
Design
Advanced Solar Components Inc. Final report, 8:53818 (R;US)
Modular solar panel, 8:53823 (P;FR;In French)
Solar energy collector, 8:53822 (P;FR;In French)
FLORIDA
Electric Utilities
Florida statewide coal-conversion study: coal-supply and transportation analysis, 8:53859 (R;US)
Fossil-Fuel Power Plants
Florida statewide coal-conversion study: coal-supply and transportation analysis, 8:53859 (R;US)
Fuel Supplies
Florida statewide coal-conversion study: coal-supply and transportation analysis, 8:53859 (R;US)
Water Resources
Water resources of Manatee County, Florida. Water-resources investigations, 8:54069 (R;US)
FLOW (FLUID)
See FLUID FLOW
FLOW MODELS
Numerical Solution
Numerical solution to the Stokes equations for flow past two spheres and a chain of particles attached to a sphere, with an application to filter clogging, 8:55122 (R;US)
Singularity
Numerical solution to the Stokes equations for flow past two spheres and a chain of particles attached to a sphere, with an application to filter clogging, 8:55122 (R;US)
FLOWMETERS
Design
Method and apparatus for determining fluid mass flowrates, 8:54774 (P;US)
FLUE GAS
Desulfurization
Engineering/economic analysis of coal preparation with flue gas desulfurization for keeping higher sulfur coals in the energy market, 8:53384 (R;US)
Full-scale utility FGD (flue gas desulfurization) system adipic acid demonstration program. Volume 1. Process results. Final report Jun 80-Nov 82, 8:53391 (R;US)
Full-scale utility FGD (flue gas desulfurization) system adipic acid demonstration program. Volume 2. Continuous emissions monitoring results. Final report Jun 80-Nov 82, 8:53392 (R;US)
Reactivity of fly ashes in a spray dryer FGD process, 8:53386 (R;US)
SO_2 abatement for coal-fired boilers in Japan. Final report Jun 81-Jan 83, 8:54905 (R;US)
Purification
CO_2-recovery from flue gases, 8:54886 (R;US)
FLUID FLOW
See also TWO-PHASE FLOW
Mathematical Models
Adaptive explicit-implicit quasi three-dimensional finite element model of flow and subsidence in multiaquifer systems, 8:54938 (J;US)
Measuring Methods
Techniques for the measurement of the air-water distribution in the flowfield of a high velocity water jet, 8:54488 (BA;US)

FLUID MECHANICS
See also HYDRODYNAMICS
Meetings
Proceedings of the 1980 Heat Transfer and Fluid Mechanics Institute, 8:54519 (R;US)
FLUIDIZATION
Hydrodynamic Model
Fluidization in two-dimensional beds with a jet. 2. Hydrodynamic modeling, 8:54364 (J;US)
FLUIDIZED BED
Bubbles
Measurements of the rise velocities of bubbles, slugs and pressure waves in a gas-solid fluidized bed using pressure fluctuation signals, 8:54526 (J;US)
Fuel Rods
Measurements of the rise velocities of bubbles, slugs and pressure waves in a gas-solid fluidized bed using pressure fluctuation signals, 8:54526 (J;US)
Particle Kinematics
Behavior of particles in a liquid-solid fluidized bed, 8:54527 (J;US)
Velocity
Measurements of the rise velocities of bubbles, slugs and pressure waves in a gas-solid fluidized bed using pressure fluctuation signals, 8:54526 (J;US)
FLUIDIZED BED REACTORS
Energy Consumption
Preliminary study of a radiantly heated fluidized bed for the production of high-purity silicon, 8:53776 (R;US)
Radiant Heat Transfer
Preliminary study of a radiantly heated fluidized bed for the production of high-purity silicon, 8:53776 (R;US)
FLUIDIZED-BED COMBUSTION
Catalysts
Catalytic fluidized-bed combustion. Enhancement of sulfation of calcium oxide by iron oxide, 8:54367 (J;US)
Computer Codes
Development of a pressurized fluidized-bed combustor model, 8:54559 (R;US)
Reviews
Fluidised bed combustion. an overview of the Norwegian program, 8:53421 (R;US)
FLUIDIZED-BED COMBUSTORS
Desulfurization
20-atmosphere rig PFBC test results: Tests 10 and 12. Investigations into the use of limestone as a sorbent, 8:54560 (R;US)
Hot Gas Cleanup
Testing and verification of granular-bed filters for the removal of particulate and alkalis. Tenth quarterly project report, January 1-March 31, 1983, 8:53385 (R;US)
Performance Testing
20-atmosphere rig PFBC test results: Tests 10 and 12. Investigations into the use of limestone as a sorbent, 8:54560 (R;US)
FLUORIDES
See also BARIUM FLUORIDES
CALCIUM FLUORIDES
STRONTIUM FLUORIDES
SULFUR FLUORIDES
Crystal Defects
Deep level defects in semiconductors. Final technical report 1 Jul 78-30 Jun 80, 8:54271 (R;US)
Ecological Concentration
Determination of baseline levels of toxic nonradioactive substances at the ICPP, 8:53648 (R;US)
FLUORINE
Activation Analysis
Elemental composition of human and animal milk. A review. A report prepared under the auspices of the IAEA in collaboration with the WHO, 8:54983 (R;XA)
FLUORINE FLUORIDES
See FLUORINE
FLUORS
See PHOSPHORS
FLUX (NEUTRON)
See NEUTRON FLUX
FLY ASH
Chemical Analysis
Identification of mutagenic constituents in coal combustion fly ash, 8:53428 (R;US)
Trace element and radionuclide mass balances at a coal-fired electric generating station, 8:54888 (J;GB)
Chlorination
Mineral recovery from coal-conversion solid wastes, 8:53387 (R;US)
Leachates
Coal combustion waste leachate scaling. Final report, July 1981-June 1982, 8:53388 (R;US)
Sintering
Mineral recovery from coal-conversion solid wastes, 8:53387 (R;US)
Sorptive Properties
Reactivity of fly ashes in a spray dryer FGD process, 8:53386 (R;US)
Waste Product Utilization
Mineral recovery from coal-conversion solid wastes, 8:53387 (R;US)
FMRB REACTOR
Availability
Report on the operation of the FMRB reactor and related activities in the year 1981, 8:53982 (R;DE;In German)
Reactor Operation
Report on the operation of the FMRB reactor and related activities in the year 1981, 8:53982 (R;DE;In German)
FOAMS
Comparative Evaluations
One dimensional foam thermal modeling of TRUPACT wall section, 8:54403 (RA;US)
Production
Stabilized aqueous foam systems, concentrate for producing a stabilized aqueous foam and method of producing said foam, 8:53723 (P;US)
Stabilization
Stabilized aqueous foam systems, concentrate for producing a stabilized aqueous foam and method of producing said foam, 8:53723 (P;US)
Temperature Effects
Thermal testing in support of the TRUPACK development program, 8:53544 (RA;US)
FOG
PH Value
The potential acidity associated with dews, frosts, and fogs, 8:54915 (J;NL)
FOOD INDUSTRY
Energy Conservation
Innovative industrial-materials processes, 8:54175 (R;US)
FORCED CONVECTION
Boundary-Value Problems
Convective heat transfer with a periodic longitudinal heat flux variation, 8:54521 (RA;US)
FORECASTING
Technology Assessment
Review of coal-supply models and forecasts: a critique of the current state-of-the-art, 8:54090 (R;US)
FORESTS
Mineral Cycling
Combined effects of atmospheric deposition, internal acid production, and harvesting on nutrient gains and losses from forest ecosystems, 8:54909 (R;US)
FORSCHUNGS UND MESSREAKTOR BRAUNSCHWEIG
See FMRB REACTOR
FORSCHUNGSREAKTOR BERLIN-2
See BER-2 REACTOR
FORT SHEVCHENKO REACTOR
See BN-350 REACTOR
FOSSIL FUEL RESERVES
See FOSSIL FUELS
FOSSIL FUELS
See also COAL
NATURAL GAS
OIL SANDS
OIL SHALES
PEAT

PETROLEUM
SHALE OIL
Cost
Cost and quality of fuels for electric utility plants: 1982 annual, 8:54095 (R;US)
POSSIL-FUEL POWER PLANTS
Air Pollution Control
Florida statewide coal-conversion study: coal-supply and transportation analysis, 8:53859 (R;US)
Data Compilation
Electric Power Quarterly, January-March 1983, 8:54097 (R;US)
Economic Impact
Analysis of the financial impacts to the industrial energy user of using coal or municipal solid waste in a new process-steam-generating plant, 8:54185 (R;US)
Environmental Effects
Impingement of threadfin shad: effects of temperature and hydrography, 8:53862 (J;US)
Trace element and radionuclide mass balances at a coal-fired electric generating station, 8:54888 (J;GB)
Flue Gas
Engineering/economic analysis of coal preparation with flue gas desulfurization for keeping higher sulfur coals in the energy market, 8:53384 (R;US)
Full-scale utility FGD (flue gas desulfurization) system adipic acid demonstration program. Volume 1. Process results. Final report Jun 80-Nov 82, 8:53391 (R;US)
Full-scale utility FGD (flue gas desulfurization) system adipic acid demonstration program. Volume 2. Continuous emissions monitoring results. Final report Jun 80-Nov 82, 8:53392 (R;US)
Fossil Fuels
Cost and quality of fuels for electric utility plants: 1982 annual, 8:54095 (R;US)
Fuels
Florida statewide coal-conversion study: coal-supply and transportation analysis, 8:53859 (R;US)
Liquid Wastes
Kinds and quantities of organic combustion products in solid and liquid wastes from a coal-fired power station, 8:53393 (R;US)
Maintenance
Coal preparation, 8:53419 (BA;US)
Radioactive Effluents
Radiological impact of the operation of coal-fired power stations within Australia, 8:53365 (RA;AU)
Retrofitting
Florida statewide coal-conversion study: coal-supply and transportation analysis, 8:53859 (R;US)
Reclaiming lost capability in power plant coal conversions: an innovative, low-cost approach. Final report (Patented method of retrofitting coal boilers previously converted to oil or gas without derating), 8:53858 (R;US)
Risk Assessment
A risk comparison summary, 8:53429 (BA;US)
Site Selection
Ohio River Valley Study. Sites, methods, data summary for 1980. Volume 1. Main report. Report, October 1979-December 1980, 8:54901 (R;US)
Ohio River Valley Study. Sites, methods, data summary for 1980. Volume 2. Appendices. Report for Oct 79-Dec 80, 8:54902 (R;US)
Solid Wastes
Kinds and quantities of organic combustion products in solid and liquid wastes from a coal-fired power station, 8:53393 (R;US)
Superheaters
Austenitic stainless steel-ferritic steel weld joint failures, 8:54245 (J;US)
POUR-PI COUNTING
Optimization
Angular coverage of detectors, 8:54724 (RA;US)
Technology Assessment
State of the art, 8:54726 (RA;US)
FRACTURE MECHANICS
Dynamic Loads
Mechanics of fracture under high-rate stress loading, 8:55081 (R;US)
FRACTURES
Annealing
Preliminary assessment of the healing of fractures in salt, 8:53662 (R;US)
FRAGMENTS (FALLOUT)
See FALLOUT
FRAGMENTS (PARTICLES)
See PARTICLES
FRANCE
Dry Storage
Dry storage of spent fuels. French experience, 8:53587 (BA;XN;In French)
Nuclear Facilities
Decommissioning engineering within the framework of the French nuclear structure, 8:53635 (RA;US)
Reactor Safety
List of reports concerning reactor safety research from BMFT, CEA, EPRI, JSTA, and USNRC, 8:54024 (R;DE;In German)
FRANCKENSTEIN
See SCANNING MEASURING PROJECTORS
FREE CONVECTION
See NATURAL CONVECTION
FREE ELECTRON LASERS
Amplifiers
Results of the Los Alamos free-electron laser experiment, 8:54513 (J;US)
Three-dimensional propagation in free-electron laser amplifiers, 8:54512 (J;US)
Design
Review of two-stage FEL research at KMS fusion. Technical report Jan-Sep 82, 8:54500 (R;US)
Energy Losses
Review of two-stage FEL research at KMS fusion. Technical report Jan-Sep 82, 8:54500 (R;US)
Experiment Planning
Los Alamos free-electron-laser oscillator experiment: plans and present status, 8:54511 (R;US)
Gain
Electron orbits in a free electron laser with a longitudinal magnetic wiggler. Technical report, 8:54501 (R;US)
Evolution of long pulses in a tapered wiggler free-electron laser, 8:54510 (R;US)
Mathematical Models
Three-dimensional propagation in free-electron laser amplifiers, 8:54512 (J;US)
Performance
Los Alamos free-electron-laser oscillator experiment: plans and present status, 8:54511 (R;US)
Results of the Los Alamos free-electron laser experiment, 8:54513 (J;US)
Pulses
Evolution of long pulses in a tapered wiggler free-electron laser, 8:54510 (R;US)
Research Programs
Free electron laser research in Europe. Technical report, 8:54502 (R;US)
Review of two-stage FEL research at KMS fusion. Technical report Jan-Sep 82, 8:54500 (R;US)
FREEZERS
Economic Analysis
Supplement to: March 1982 consumer products efficiency standards, engineering analysis and economic analysis documents, 8:54135 (R;US)
Efficiency
Supplement to: March 1982 consumer products efficiency standards, engineering analysis and economic analysis documents, 8:54135 (R;US)
Standards
Supplement to: March 1982 consumer products efficiency standards, engineering analysis and economic analysis documents, 8:54135 (R;US)

FREEZING
Phase Studies
Some aspects of the computer simulation of conduction heat transfer and phase change processes, 8:54045 (BA;US)
FRESH WATER ECOSYSTEMS
See AQUATIC ECOSYSTEMS
FROST
PH Value
The potential acidity associated with dews, frosts, and fogs, 8:54915 (J;NL)
FUEL ASSEMBLIES
Burnup
Burnup-dependent cross-section data for research reactors, 8:53957 (R;US)
Evaluation and demonstration of methods for improved fuel utilization. Seventh semi-annual progress report, October 1, 1982-March 31, 1983 (PWR), 8:53874 (R;US)
Fuel Management
Evaluation and demonstration of methods for improved fuel utilization. Seventh semi-annual progress report, October 1, 1982-March 31, 1983 (PWR), 8:53874 (R;US)
Hydrodynamics
Experimental investigation of local hydrodynamic characteristics of the peripheral area of a fast reactor fuel assembly. 2. Results of measurements at rated geometry, 8:53903 (R;CS;In Russian)
Mesh Generation
Mesh generation for fast reactor fuel assembly in velocity and temperature field calculations using finite element method, 8:53922 (R;CS;In Czech)
Post-Irradiation Examination
Post irradiation examination of JOYO fuel subassemblies, 8:53972 (R;JP)
FUEL CANS
Fabrication
Improved encapsulated fuel unit and method of forming same, 8:53934 (P;US)
Temperature Measurement
Use of chromel-alumel thermocouples in high temperature experiments in WAGR, 8:53879 (R;XA)
FUEL CELL POWER PLANTS
For commercial, residential, or electric utility use.
Coal Gasification
Development of a hot-gas-cleanup system for integrated coal-gasification/molten-carbonate fuel-cell power plants. Quarterly progress report, April-June 1983, 8:54115 (R;US)
Economics
40-kW on-site fuel-cell unit, 8:54119 (RA;US)
Fuel cells for power plants, 8:54118 (RA;US)
Energy Efficiency
40-kW on-site fuel-cell unit, 8:54119 (RA;US)
Environmental Impacts
Fuel cells for power plants, 8:54118 (RA;US)
Performance
Solid-oxide fuel-cell performance, 8:54120 (R;US)
Systems Analysis
Solid-oxide fuel-cell performance, 8:54120 (R;US)
FUEL CELLS
See also HIGH-TEMPERATURE FUEL CELLS
HYDROGEN FUEL CELLS
Design
Rapidly refuelable fuel cell, 8:54123 (P;US)
Electrical Insulators
Electrically insulating and sealing frame, 8:54122 (P;US)
Field Tests
On-site fuel cell field test support program. Annual report Jul 81-Jun 82, 8:54121 (R;US)
Performance
On-site fuel cell field test support program. Annual report Jul 81-Jun 82, 8:54121 (R;US)
Research Programs
Fuel cells for power plants, 8:54118 (RA;US)
Seals
Electrically insulating and sealing frame, 8:54122 (P;US)
FUEL CHANNELS
Fluid Flow
Thermal and hydraulic experiments of JOYO fuel subassembly, 8:53973 (R;JP)
FUEL CONSUMPTION
Energy Conservation
Energy-conservation programs: Kauai County, 8:54177 (RA;US)
FUEL COOLING INSTALLATIONS
See SPENT FUEL STORAGE
FUEL CYCLE
Actinides
Studies on the properties of hard-spectrum, actinide fissioning reactors. Final report, 8:53913 (R;US)
Study of the behavior of actinides continuously recycled in a hard spectrum reactor, 8:53912 (R;US)
Economics
Performance and fuel-cycle cost comparisons with HEU and LEU fuels, 8:53955 (R;US)
FUEL ELEMENTS
See also FUEL PINS
FUEL PLATES
SPENT FUEL ELEMENTS
Axially staggered seed-blanket reactor-fuel-module construction (LWBR), 8:53904 (P;US)
Performance Testing
Status of RERTR fuel demonstrations, 8:53956 (R;US)
Road Transport
Overview of DOE/PNC joint program on transportation technology, 8:53509 (RA;US)
FUEL FABRICATION PLANTS
Decommissioning
Characterization of nuclear fuel cycle facilities requiring decommissioning and decontamination, 8:53632 (RA;US)
Decommissioning a plutonium fabrication facility, 8:53612 (RA;US)
General Electric Fuels Laboratory decontamination and decommissioning, 8:53617 (RA;US)
Decontamination
Characterization of nuclear fuel cycle facilities requiring decommissioning and decontamination, 8:53632 (RA;US)
General Electric Fuels Laboratory decontamination and decommissioning, 8:53617 (RA;US)
FUEL GAS
See also NATURAL GAS
Calorific Value
Gasification of Simplex briquets: demonstration in the General Electric high-pressure gasifier. Vol.2. Final report, 8:53347 (R;US)
Chemical Composition
Gasification of Simplex briquets: demonstration in the General Electric high-pressure gasifier. Vol.2. Final report, 8:53347 (R;US)
FUEL MANAGEMENT
Evaluation and demonstration of methods for improved fuel utilization. Seventh semi-annual progress report, October 1, 1982-March 31, 1983 (PWR), 8:53874 (R;US)
FUEL PENCILS
See FUEL PINS
FUEL PINS
Couplings
Sealing coupling (LMFBR), 8:53905 (P;US)
Temperature Measurement
Fuel temperature measurement in the WAGR, 8:53880 (R;XA)
FUEL PLATES
Fabrication
Improved encapsulated fuel unit and method of forming same, 8:53934 (P;US)
Performance Testing
RERTR program progress in qualifying reduced-enrichment fuels, 8:53962 (R;US)
FUEL REPROCESSING PLANTS
See also IDAHO CHEMICAL PROCESSING PLANT
Decommissioning
Characterization of nuclear fuel cycle facilities requiring decommissioning and decontamination, 8:53632 (RA;US)
Decontamination
Characterization of nuclear fuel cycle facilities requiring decommissioning and decontamination, 8:53632 (RA;US)

Radioactive Effluents
Determination of low specific activity iodine-129 off-gas concentrations by GC separation and negative ionization mass spectrometry, 8:53647 (R;US)

FUEL SHEATHS
See FUEL CANS

FUEL SLURRIES
Meetings
Technology of preparation, combustion and commercial application of coal-water slurry fuels; shape selective catalysis and synthesis gas chemistry: routes to chemicals and fuels; general papers: combustion and coke; chemistry of combustion processes (abstracts only); pyrolysis processes and products from heavy feedstocks (abstracts only), 8:53422 (B;US)

FUEL SUBSTITUTION
Cost Benefit Analysis
Technical and economic feasibility of utilizing apple pomace as a boiler feedstock, 8:53746 (R;US)

FUEL SUSPENSIONS
See FUEL SLURRIES

FUEL-CLADDING INTERACTIONS
Inspection
Technique for examining the fuel/cladding interface by TEM (LMFBR), 8:53897 (R;US)
Transmission Electron Microscopy
Technique for examining the fuel/cladding interface by TEM (LMFBR), 8:53897 (R;US)

FUELS (NUCLEAR)
See NUCLEAR FUELS

FUMES
See AEROSOLS

FUNCTION GENERATORS
Uses
Application of function generator for checking reactivity meter accuracy, 8:53942 (R;HU)

2-FURALALDEHYDE
See FURFURAL

FURFURAL
Chemical Feedstocks
Integrated liquid-fuel production, 8:53769 (RA;US)

FURNACES
Economic Analysis
Supplement to: March 1982 consumer products efficiency standards, engineering analysis and economic analysis documents, 8:54135 (R;US)
Efficiency
Supplement to: March 1982 consumer products efficiency standards, engineering analysis and economic analysis documents, 8:54135 (R;US)
Flue Gas
Characterization and processing of coal fired copper reverberatory flue dusts. Open file report 1 October 80-30 September 82, 8:54172 (R;US)
Heat Recovery Equipment
State-of-the-art of furnace recuperation in the primary metals industry: technical briefing report, 8:54174 (R;US)
Performance
Effect of fuel gas composition on appliance performance. Topical report Jul 78-Dec 82, 8:53447 (R;US)
Standards
Supplement to: March 1982 consumer products efficiency standards, engineering analysis and economic analysis documents, 8:54135 (R;US)

FUSION FUELS
See THERMONUCLEAR FUELS

FUSION (MELTING)
See MELTING

FUSION (NUCLEAR)
See THERMONUCLEAR REACTIONS

FUSION REACTORS
See THERMONUCLEAR REACTORS

G

GAGES (PRESSURE)
See PRESSURE GAGES

GALLIUM 67
Radiochemistry
In vitro transfer of Ga-67 from transferrin to ferritin, 8:54347 (J;US)

GALLIUM ARSENIDES
Crystal Defects
Deep level defects in semiconductors. Final technical report 1 Jul 78-30 Jun 80, 8:54271 (R;US)
Electronic Structure
Electronic states of (2 x 1) and (1 x 1) (111) surfaces of Ge, Si diamond, GaAs and Ge on Si, 8:54286 (J;NL)
Ion Microprobe Analysis
Investigation of impurity concentrations and electrical properties near interfaces. Final report 1 Feb 81-31 Aug 82, 8:55102 (R;US)

GALLIUM COMPLEXES
Radiochemistry
In vitro transfer of Ga-67 from transferrin to ferritin, 8:54347 (J;US)

GAMMA DETECTION
Semiconductor Detectors
Cadmium telluride detectors for gamma dose-rate meters, 8:54645 (R;US)
Solid Scintillation Detectors
Spectrometer for studying spontaneous radiation emitted during high-energy electron and positron channeling in monocrystals, 8:54704 (R;SU;In Russian)

GAMMA DOSIMETRY
Calibration
Tests of health physics detectors and dosimeters to 6 and 9 MeV gamma-radiation, 8:54671 (R;FR;In French)
Thermoluminescent Dosemeters
Homogeneous TL dosemeter for direct reading of the biological radiation exposure in mixed neutron-gamma fields, 8:54735 (R;DD;In German)

GAMMA RADIATION
Attenuation
Measurements of neutron and gamma ray streaming through a duct, (2), (3), 8:53976 (R;JP;In Japanese)
Specifications
Specification for symbol for ionizing radiation, 8:55211 (R;MY)

GAMMA SPECTRA
Doppler Broadening
Doppler-broadening lineshape parameter standard, 8:54751 (BA;NL)

GAMMA SPECTROSCOPY
Coincidence Methods
Method of summation of amplitudes of coinciding pulses from Ge(Li) detectors used to study cascades of gamma-transitions in (n,γ) reaction, 8:54705 (R;SU;In Russian)
Li-Drifted Ge Detectors
Method of summation of amplitudes of coinciding pulses from Ge(Li) detectors used to study cascades of gamma-transitions in (n,γ) reaction, 8:54705 (R;SU;In Russian)
Solid Scintillation Detectors
Simultaneous spectral measurement of fast neutrons and rays with an organic scintillator, 8:54753 (TJ;US)

GAMMA-RAY LASERS
See GASERS

GARNETS
For silicate garnets only.
Physical Radiation Effects
Radiation damage in ceramics: the influence of grain boundaries ($MgAl_2O_4$; YAG), 8:54258 (RA;US)

GAS CENTRIFUGES
Transport
Gas centrifuge enrichment plant: a future transportation challenge, 8:53470 (RA;US)

GAS COOLED FAST BREEDER REACTOR
See GCFR REACTOR

GAS COOLED REACTORS
See also HTGR TYPE REACTORS
PEBBLE BED REACTORS
Reactor Cores
Specialists' meeting on gas-cooled reactor core and high temperature instrumentation, Windermere, UK, 15-17 June 1982. Summary report, 8:53890 (R;XA)
Reactor Instrumentation
Specialists' meeting on gas-cooled reactor core and high temperature instrumentation, Windermere, UK, 15-17 June 1982. Summary report, 8:53890 (R;XA)
GAS CYLINDERS
Repair
New method to repair uranium hexafluoride cylinders, 8:54394 (RA;US)
Testing
Testing of the Model 48-14 overpack for UF_6 cylinders, 8:54406 (RA;US)
GAS ENGINES
See INTERNAL COMBUSTION ENGINES
GAS LASERS
Induction
Inductive gas line for pulsed lasers, 8:54516 (P;US)
Laser Cavities
Experimental study of resonance radiation trapping as a method of gain improvement for efficient power extraction from the XeF blue-green laser transition. Final technical report 1 Jan 80-30 Sep 81, 8:54504 (R;US)
Nuclear Pumping
Study of $O_2(^1\Delta)$ production by nuclear pumping. Final report submitted to the Air Force Weapons Laboratory, 8:54509 (R;US)
Tubes
Inductive gas line for pulsed lasers, 8:54516 (P;US)
GAS UTILITIES
Rate Structure
Commercial energy costs for SOLCOST data bank cities, Winter 1982-1983, 8:54105 (R;US)
GAS WELLS
See NATURAL GAS WELLS
GASBUGGY EVENT
Seismographs
Magnitude/yield variability in the western United States: analysis of the Rulison/Gasbuggy anomaly. Final report 1 Dec 81-30 Nov 82, 8:54869 (R;US)
GASEOUS DIFFUSION PROCESS
Statistical Mechanics
Study of mechanism of hydrogen diffusion in separation devices. Progress report for 1980-1983, 8:53730 (R;US)
GASERS
Gamma-ray Amplification by Stimulated Emission of Radiation.
Design
Study of a nuclear gamma-ray laser. Interim technical report, 8:54506 (R;US)
GASIFICATION
Any technique for converting coal or other products into gaseous fuel.
See also COAL GASIFICATION
IN-SITU GASIFICATION
Research Programs
Liquid-fuel research in Hawaii, 8:53768 (RA;US)
GASKETS
Quality Assurance
Elastomere gasket: a black sheep for quality assurance measures, 8:54457 (RA;US)
GASOLINE
Gas Chromatography
Development of an improved method for the analysis of pressure-core samples. Final report, 8:53432 (R;US)
Mass Spectroscopy
Development of an improved method for the analysis of pressure-core samples. Final report, 8:53432 (R;US)
Mixtures
Assessment of ether and alcohol fuels from coal. Volume I. Summary. Final report, 8:53742 (R;US)
GASOLINE ENGINES
See INTERNAL COMBUSTION ENGINES
GASTEROPODS
See MOLLUSCS
GASTROINTESTINAL TRACT
Radionuclide Kinetics
Calculating the gastrointestinal tract activity following the inhalation of a radioactive aerosol, 8:55049 (J;GB)
GATING CIRCUITS
On-Line Measurement Systems
Event selection in the experiments on studying μ-atomic and mesic molecular processes, 8:54696 (R;SU;In Russian)
GCFR REACTOR
Reactor Core Restraints
Core support performance test in the component flow test loop, 8:53906 (BA;GB)
GENERATORS (ELECTRIC)
See ELECTRIC GENERATORS
GENERATORS (RADIOISOTOPE)
See RADIOISOTOPE GENERATORS
GENERATORS (STEAM)
See STEAM GENERATORS
GENETIC ENGINEERING
Uses
Genetic engineering in biotechnology, 8:53781 (R;US)
GEOLOGIC FAULTS
Remote Sensing
Use of aircraft imagery in evaluating ground stability at open-pit uranium mines in Gas Hills, Wyoming, 8:53468 (R;US)
GEOLOGIC FORMATIONS
Compressed Air Energy Storage
Geologic concepts for cavern storage between Washington and Boston, 8:54043 (RA;US)
GEOLOGIC STRUCTURES
See also GEOLOGIC FAULTS
Remote Sensing
Utilization of snow-enhancement techniques for acquisition of geological and geo-environmental information from ERTS imagery, 8:55079 (R;US)
GEOLOGIC THERMOMETRY
See GEOTHERMOMETRY
GEOLOGY
Acoustic Measurements
Acoustic-velocity measurements in materials using a regenerative method, 8:54775 (P;US)
GEOMAGNETIC FIELD
Pulsations
Project to develop an index of pc 3,4,5 geomagnetic pulsations and to study their control by solar wind parameters. Final report, 8:55100 (R;US)
GEOTHERMAL AREAS
See GEOTHERMAL FIELDS
GEOTHERMAL EXPLORATION
Exploration for sources of geothermal energy.
Information Dissemination
Developer's point of view concerning geothermal resources in Hawaii, 8:53830 (RA;US)
Well Drilling
Developer's point of view concerning geothermal resources in Hawaii, 8:53830 (RA;US)
GEOTHERMAL FIELDS
See also CERRO PRIETO GEOTHERMAL FIELD
HEBER GEOTHERMAL FIELD
Aquaculture
Aquaculture report 1976, 8:53839 (R;US)
GEOTHERMAL POWER PLANTS
Maintenance
Heber Geothermal Binary Demonstration Project. Final design availability assessment. Revision 1, 8:53834 (R;US)
GEOTHERMAL REGIONS
See GEOTHERMAL FIELDS
GEOTHERMAL RESOURCES
Energy Source Development
HGP - a geothermal project, 8:53835 (RA;US)
Exploration
Kahauale'a Geothermal Project, 8:53831 (RA;US)
Institutional Factors
Kahauale'a Geothermal Project, 8:53831 (RA;US)

Private-sector geothermal development, 8:53832 (RA;US)
Land Leasing
Leasing of federal surface lands for direct-use geothermal-energy developments, 8:53840 (R;US)
Market
Developer's point of view concerning geothermal resources in Hawaii, 8:53830 (RA;US)
Property Rights
Resource rights: geothermal and solar energy, 8:54109 (RA;US)
GEOTHERMAL SYSTEMS
Reservoir Engineering
Proceedings of fifth workshop on Geothermal Reservoir Engineering, 8:53837 (R;US)
GEOTHERMAL WELLS
Well Drilling
Potential advantages of a water jet reaming device, 8:53838 (BA;US)
GEOTHERMOMETERS
Improvements in geothermometry. Final technical report. Rev., 8:53841 (R;US)
GEOTHERMOMETRY
Improvements in geothermometry. Final technical report. Rev., 8:53841 (R;US)
GERMAN FEDERAL REPUBLIC
See FEDERAL REPUBLIC OF GERMANY
GERMANIUM
Electronic Structure
Electronic states of (2 x 1) and (1 x 1) (111) surfaces of Ge, Si diamond, GaAs and Ge on Si, 8:54286 (J;NL)
Physical Radiation Effects
Formation of point defect clusters in electron irradiated germanium, 8:54230 (RA;US)
GERMANY (FEDERAL REPUBLIC)
See FEDERAL REPUBLIC OF GERMANY
GLASS
See also BOROSILICATE GLASS
PHOSPHATE GLASS
Ion Implantation
Alkali depletion and ion-beam mixing in glasses, 8:54281 (R;US)
Radiation Effects
Electron radiation damage in silicate glasses, 8:54280 (RA;US)
Service Life
Durability of marker materials for nuclear waste isolation sites, 8:53670 (R;US)
GLASS INDUSTRY
Energy Conservation
Innovative industrial-materials processes, 8:54175 (R;US)
GLASSY METALS
See METALLIC GLASSES
GLOVEBOXES
Decommissioning
Decommissioning a plutonium fabrication facility, 8:53612 (RA;US)
Decontamination
Decommissioning a plutonium fabrication facility, 8:53612 (RA;US)
Intervention device for use in a hostile environment, 8:54377 (RA;US)
Los Alamos DP West Plutonium Facility decontamination project, 8:53613 (RA;US)
GLUCOSE
Fermentation
Ethanol production by Zymomonas mobilis, 8:53741 (R;US)
GLUEBALLS
Status of the iota (1440) and θ (1640) as gluonium candidates, 8:55141 (R;US)
Meson Spectroscopy
High-energy physics progress report, 1983-1984, 8:55138 (R;US)
GLUONIUM
See GLUEBALLS
GLYCINE HISPIDA
Contamination
Plutonium contents and fluxes in a soybean crop ecosystem near a nuclear fuel chemical separations facility, 8:54931 (J;US)
GLYCOLS
See also POLYETHYLENE GLYCOLS
Excitation
Chemiluminescence of benzo[a]pyrene-7,8-diol, 8:54342 (J;GB)
Luminescence
Chemiluminescence of benzo[a]pyrene-7,8-diol, 8:54342 (J;GB)
Structural Chemical Analysis
Chemiluminescence of benzo[a]pyrene-7,8-diol, 8:54342 (J;GB)
GOBAR GAS
See METHANE
GOLD
Electroplating
Conditions for dropwise condensation on electroplated gold. Final report, February 15, 1980-August 14, 1983, 8:54209 (R;US)
GOLD ALLOYS
Recrystallization
Moessbauer spectroscopy study of amorphous $Fe_{77}B_{11}Au_8$ ribbon and its crystallization products, 8:54216 (R;US)
GOVERNMENT POLICIES
See also ENERGY POLICY
ENVIRONMENTAL POLICY
Constraints
Political framework conditions of research and technology, 8:54071 (R;DE;In German)
Financial Incentives
Political framework conditions of research and technology, 8:54071 (R;DE;In German)
GRAIN ALCOHOL
See ETHANOL
GRAINS (CEREAL)
See CEREALS
GRAMINEAE
See also CEREALS
SUGAR CANE
Radiation Monitoring
Intercomparison of some environmental monitoring methods applied at nuclear power plants in Czechoslovakia (Bohunice) and in Hungary (Paks), 8:54925 (R;HU)
GRANITES
Service Life
Durability of marker materials for nuclear waste isolation sites, 8:53670 (R;US)
Stress Corrosion
Effect of strain rate and stress corrosion on the long-term strength of crystalline rocks. Final report, 8:55080 (R;US)
GRANULAR BED FILTERS
Design
Testing and verification of granular-bed filters for the removal of particulate and alkalis. Tenth quarterly project report, January 1-March 31, 1983, 8:53385 (R;US)
Testing
Testing and verification of granular-bed filters for the removal of particulate and alkalis. Tenth quarterly project report, January 1-March 31, 1983, 8:53385 (R;US)
GRANULOCYTES
See LEUKOCYTES
GRASERS
See GASERS
GREAT BRITAIN
See UNITED KINGDOM
GREAT LAKES REGION
See FEDERAL REGION V
GREENHOUSES
Decision Making
Closing-down greenhouses in times of high energy demand (Decision re closing in winter season and recommendations), 8:54166 (R;DE;In German)
Decommissioning
Closing-down greenhouses in times of high energy demand (Decision re closing in winter season and recommendations), 8:54166 (R;DE;In German)
Space Heating
Closing-down greenhouses in times of high energy demand (Decision re closing in winter season and recommendations), 8:54166 (R;DE;In German)

GRINDING MACHINES
Ultrasonic Machining
Ultrasonic-impact grinder system, 8:54481 (P;US)
GROSSWELZHEIM HDR REACTOR
See HDR REACTOR
GROUND SUBSIDENCE
Mathematical Models
Adaptive explicit-implicit quasi three-dimensional finite element model of flow and subsidence in multiaquifer systems, 8:54938 (J;US)
GROUND WATER
Flow Models
Potentiometric-level monitoring program - Mississippi and Louisiana: annual status report for Fiscal Year 1982, 8:53671 (R;US)
Radionuclide Migration
Geochemical assessment of nuclear waste isolation. Report of activities during fiscal year 1982, 8:53649 (R;US)
Water Pollution
Application of Kelgraph to electrochemical detectors for flow injection analysis and high performance liquid chromatography. Technical report, 8:54299 (R;US)
GROUND-WATER RESERVES
See AQUIFERS
GROUTING
Performance Testing
Petrographic examination of Bell Canyon Tests (BCT) 1-FF field grouts over a three-year period, 8:53645 (R;US)
Petrography
Petrographic examination of Bell Canyon Tests (BCT) 1-FF field grouts over a three-year period, 8:53645 (R;US)
GROWTH (CRYSTAL)
See CRYSTAL GROWTH
GULF GENERAL ATOMIC FAST BREEDER REACTOR
See GCFR REACTOR
GUNDREMMINGEN-2 REACTOR
Reactor Decommissioning
Decommissioning of Unit A of the nuclear power plant Gundremmingen and its conversion to a condition of protective storage, 8:54016 (RA;US)
Neutron activation of reactor pressure vessel and biological shield of the decommissioned Gundremmingen Unit A Nuclear Power Station, 8:54001 (RA;US)
Plans and activities for decommissioning of LWR power plants by the German utilities, 8:54003 (RA;US)
GUNS
Hazards
Effect of base gaps on setback-shock sensitivities of cast composition B and TNT as determined by the NSWC setback-shock simulator, 8:54855 (RA;US)
GYROTRONS
See MICROWAVE AMPLIFIERS

H

HADRON-HADRON INTERACTIONS
Reviews
Hadron physics at the workshop, 8:55132 (RA;XC)
HADRONS
Jet Model
Analysis of hadron jet behaviour in πp C interactions at 40 GeV/c, 8:55173 (R;SU;In Russian)
Particle Production
Analysis of hadron jet behaviour in π^- C interactions at 40 GeV/c, 8:55173 (R;SU;In Russian)
HAFNIUM OXIDES
Electric Conductivity
Electrical conductivities of polycrystalline and single-crystal Er_2O_3-stabilized hafnia, 8:54256 (R;US)
HALDEN HEAVY BOILING WATER REACTOR
See HBWR REACTOR
HAM
See MEAT
HANDLING (DATA)
See DATA PROCESSING
HANFORD ATOMIC PRODUCTS OPERATION
See HAPO
HANFORD RESERVATION
Geologic Deposits
Preliminary interpretation of the tectonic stability of the reference repository location, Cold Creek syncline, Hanford Site (Pasco Basin), 8:53680 (R;US)
Health Hazards
Critical review of the Hanford worker studies: cancer risk and low-level radiation, 8:55037 (RA;US)
HAPO
Radioactive Waste Management
Rockwell Hanford Operations. Defense waste and byproducts management monthly report, 8:53681 (R;US)
Rockwell Hanford Operations monthly report summary, June 1983, 8:53474 (R;US)
Research Programs
Rockwell Hanford Operations monthly report summary, June 1983, 8:53474 (R;US)
HARBORS
Depth
Florida statewide coal-conversion study: coal-supply and transportation analysis, 8:53859 (R;US)
Economic Development
Area development plan for Radio Island, 8:54060 (R;US)
Regional Cooperation
Area development plan for Radio Island, 8:54060 (R;US)
HARVESTING
Environmental Effects
Combined effects of atmospheric deposition, internal acid production, and harvesting on nutrient gains and losses from forest ecosystems, 8:54909 (R;US)
HAWAII
Air Conditioning
Proper engineering for energy conservation, 8:54132 (RA;US)
Biomass
Liquid-fuel research in Hawaii, 8:53768 (RA;US)
Biomass Conversion Plants
Integrated liquid-fuel production, 8:53769 (RA;US)
Molokai Biomass Project, 8:53767 (RA;US)
Buildings
How to organize an energy-conservation program for new and existing buildings, 8:54133 (RA;US)
Electric Power
Electricity's role in promoting conservation in Hawaii, 8:54092 (RA;US)
Electric-Powered Vehicles
Electric-vehicle operations at the Hawaiian Telephone Company, 8:54151 (RA;US)
Energy Audits
Energy-conservation programs: Kauai County, 8:54177 (RA;US)
Energy Conservation
Energy-conservation program: University of Hawaii at Manoa, 8:54077 (RA;US)
Energy-conservation programs: County of Hawaii, 8:54178 (RA;US)
Energy-conservation programs: County of Maui, 8:54191 (RA;US)
Energy-conservation programs: Building Dept., Building Dept., City and County of Honolulu, 8:54179 (RA;US)
Federal conservation programs in the 80's, 8:54076 (RA;US)
Governor's energy conference - Hawaii's energy options for the 80s, 8:54053 (R;US)
Hawaii's energy options for the 80's, 8:54078 (RA;US)
Proper engineering for energy conservation, 8:54132 (RA;US)
Tax credits claimed by Hawaii residents, 8:53762 (RA;US)
Energy Policy
Governor's energy conference - Hawaii's energy options for the 80s, 8:54053 (R;US)
State energy planning, 8:54084 (RA;US)
Energy Sources
Governor's energy conference - Hawaii's energy options for the 80s, 8:54053 (R;US)

Hawaii's energy options for the 80's, 8:54078 (RA;US)
Eucalyptuses
Eucalyptus plantations for energy production in Hawaii, 8:53766 (RA;US)
Fuel Consumption
Energy-conservation programs: Kauai County, 8:54177 (RA;US)
Geothermal Exploration
Developer's point of view concerning geothermal resources in Hawaii, 8:53830 (RA;US)
Geothermal Resources
Developer's point of view concerning geothermal resources in Hawaii, 8:53830 (RA;US)
HGP - a geothermal project, 8:53835 (RA;US)
Kahauale'a Geothermal Project, 8:53831 (RA;US)
Private-sector geothermal development, 8:53832 (RA;US)
Resource rights: geothermal and solar energy, 8:54109 (RA;US)
Hospitals
Solar-photovoltaic energy system for the G.N. Wilcox Memorial Hospital and Health Care Center, 8:53789 (RA;US)
Hydroelectric Power
Hydroelectric development in Hawaii, 8:53752 (RA;US)
Hydrogen-Based Economy
Hydrogen in energy, 8:53733 (RA;US)
Interconnected Power Systems
Hawaii Deep-Water Cable Program: electrical-grid-system integration investigations, 8:54093 (RA;US)
Medical Centers
Energy management in a health-care institute, 8:54131 (RA;US)
Ocean Thermal Energy Conversion
Development of ocean thermal energy conversion, 8:53797 (RA;US)
OTEC power for Hawaii, 8:53796 (RA;US)
Tower-based OTEC design for Hawaii, 8:53795 (RA;US)
Petroleum
Strategic Petroleum Reserve and Hawaii, 8:54091 (RA;US)
Photovoltaic Power Plants
Solar-photovoltaic energy system for the G.N. Wilcox Memorial Hospital and Health Care Center, 8:53789 (RA;US)
Public Buildings
Energy conservation in State buildings, 8:54130 (RA;US)
Public Utilities
Energy-conservation programs: County of Hawaii, 8:54178 (RA;US)
Public Utility Regulatory Policies Act of 1978 (PURPA) and the State of Hawaii Public Utilities Commission (PUC) regulations, 8:54086 (RA;US)
Public Utility Regulatory Policies Act
Concerns in establishing PURPA regulations, 8:54087 (RA;US)
Renewable Energy Sources
Overview of renewable-energy development in Hawaii, 8:54107 (RA;US)
Solar hot-water heaters, 8:53800 (RA;US)
State energy planning, 8:54084 (RA;US)
School Buildings
Energy-conservation program: University of Hawaii at Manoa, 8:54077 (RA;US)
Solar Energy
Resource rights: geothermal and solar energy, 8:54109 (RA;US)
Solar-photovoltaic energy system for the G.N. Wilcox Memorial Hospital and Health Care Center, 8:53789 (RA;US)
Solar Ponds
Hawaii solar pond project, 8:53817 (RA;US)
Solar Water Heaters
Solar hot-water heaters, 8:53800 (RA;US)
Strategic Petroleum Reserve
Strategic Petroleum Reserve and Hawaii, 8:54091 (RA;US)
Sugar Cane
Biomass-energy development in the sugar industry, 8:53765 (RA;US)
Transportation Sector
Energy-conservation programs, State Department of Transportation, 8:54150 (RA;US)
Wind Power
Overview of Hawaii's wind-energy program, 8:53842 (RA;US)
Overview of the wind-energy project at Kahuku Seafood Plantation, 8:54108 (RA;US)
Wind Power Plants
Utility-scale wind energy and the Kahuku wind-energy project, 8:53845 (RA;US)
HAZARDOUS MATERIALS
Not for radioactive materials.
Underground Storage
Hazardous waste landfill research, 8:54910 (R;US)
Waste Disposal
Remedial actions at hazardous waste sites: survey and case studies. Final report, 8:54942 (R;US)
HB ROBINSON-2
See ROBINSON-2 REACTOR
HBWR REACTOR
Reactor Kinetics
Investigation of the resonant power oscillation in the Halden Boiling Water Reactor by autoregressive modeling, 8:53870 (RA;JP;In Japanese)
Reactor Noise
Investigation of the resonant power oscillation in the Halden Boiling Water Reactor by autoregressive modeling, 8:53870 (RA;JP;In Japanese)
HCDA
See REACTOR CORE DISRUPTION
H-COAL PROCESS
Catalysts
Studies on aged H-Coal catalysts. Final report, 8:53350 (R;US)
Heat Exchangers
Metallurgical study of a failed heat exchanger in a H-coal/sup (R)/ pilot plant, 8:53364 (J;US)
HD 8077
See NICKEL BASE ALLOYS
HDO
See DEUTERIUM COMPOUNDS
HDR REACTOR
Reactor Safety
Research at full-scale: the HDR programme (Safety), 8:54039 (J;GB)
HEALTH HAZARDS
See also RADIATION HAZARDS
Public Opinion
Public perceptions of risk, 8:55025 (RA;US)
Research Programs
Bureau of Mines coal mining, health and safety, research and development. 1975 annual report and achievements, 8:53404 (R;US)
Risk Assessment
Demographic model for performing site-specific health risk projections, 8:55059 (J;GB)
HEALTH PHYSICS
See RADIATION PROTECTION
HEAT DISSIPATION
See DIFFUSION
HEAT TRANSFER
HEAT DISTRIBUTION SYSTEMS
District-heating handbook. Volume 1. A design guide (Book), 8:54190 (B;US)
HEAT EXCHANGERS
Brazing
Method for braze-joining spirally wound tapes to inner walls of heat exchanger tubes, 8:54530 (P;US)
Computer Codes
Computer program for performance and sizing analysis of compact counter-flow plate-fin heat exchangers. Research and development report, 8:54517 (R;US)
Eddy Current Testing
Eddy-current-inspection method for ferromagnetic transfer tubes: first report, 8:54545 (TJ;US)

Failures
Metallurgical study of a failed heat exchanger in a H-coal/sup (R)/ pilot plant, 8:53364 (J;US)
Fins
Computer program for performance and sizing analysis of compact counter-flow plate-fin heat exchangers. Research and development report, 8:54517 (R;US)
Performance
Computer program for performance and sizing analysis of compact counter-flow plate-fin heat exchangers. Research and development report, 8:54517 (R;US)
Performance Testing
Experimental results and operational characteristics of heat exchangers in dry/wet operations, 8:54523 (R;US)
Plates
Computer program for performance and sizing analysis of compact counter-flow plate-fin heat exchangers. Research and development report, 8:54517 (R;US)
Sizing
Computer program for performance and sizing analysis of compact counter-flow plate-fin heat exchangers. Research and development report, 8:54517 (R;US)
Spiral Configuration
Method for braze-joining spirally wound tapes to inner walls of heat exchanger tubes, 8:54530 (P;US)

HEAT METERS
Parametric Analysis
Transient response of circular-foil heat-flux gages, 8:54768 (R;US)
Transients
Transient response of circular-foil heat-flux gages, 8:54768 (R;US)

HEAT PUMPS
See also WATER SOURCE HEAT PUMPS
Control Systems
Central heat pump units - problems of heat output control, 8:54129 (R;DE;In German)
Design
Design, construction and testing of a gas engine driven high temperature industrial heat pump. Final report, 8:54170 (R;US)
Meetings
Heat pumps - technology, economy, selection, installation, 8:54167 (R;DE;In German)
Refrigerants
Evaluation of the use of multicomponent refrigerants in gas-fired heat pumps. Final report Jan 82-Feb 83, 8:54142 (R;US)
Testing
Design, construction and testing of a gas engine driven high temperature industrial heat pump. Final report, 8:54170 (R;US)

HEAT RECOVERY EQUIPMENT
Technology Assessment
State-of-the-art of furnace recuperation in the primary metals industry: technical briefing report, 8:54174 (R;US)

HEAT STORAGE DEVICES
See THERMAL ENERGY STORAGE EQUIPMENT

HEAT STORAGE SYSTEMS
See THERMAL ENERGY STORAGE EQUIPMENT

HEAT TRANSFER
See also RADIANT HEAT TRANSFER
Computer Calculations
Heat transfers: calculation of temperatures using a HP 41 CV microcomputer, 8:54518 (RA;US)
Meetings
Proceedings of the 1980 Heat Transfer and Fluid Mechanics Institute, 8:54519 (R;US)

HEAT TRANSFER FLUIDS
Environmental Impacts
Preliminary assessment of the use of heat transfer fluids for solar thermal energy systems. Final report May 81-Apr 82, 8:53763 (R;US)

HEAT TRANSMISSION
See HEAT TRANSFER

HEATING
See also DISTRICT HEATING
Electron Beams
Electron beam initiation of high explosives, 8:54791 (RA;US)

HEAVY ION ACCELERATORS
Includes combined accelerator types for heavy ion acceleration.
See also HILACS
Kilo Amp Beam Currents
Outline of heavy ion beam accelerator for inertial confinement fusion, 8:54639 (RA;JP)
Penning Ion Sources
Ion source of the accelerator for heavy ion fusion, 8:54607 (RA;JP)
Research Programs
New heavy-ion-fusion accelerator research program, 8:55306 (R;US)
Storage Rings
Operating status of TARN vacuum system and future tasks, 8:54642 (RA;JP;In Japanese)
Outline of heavy ion beam accelerator for inertial confinement fusion, 8:54639 (RA;JP)

HEAVY ION LINEAR ACCELERATORS
See HILACS

HEAVY ION SPECTROMETERS
Vacuum Systems
344 cm x 86 cm low mass vacuum window, 8:54620 (R;US)

HEAVY IONS
Whenever possible use one of the more specific terms listed under ION BEAMS.
Coherent Scattering
Coherent instability of the heavy ion beam in the storage ring, 8:54637 (RA;JP)

HEAVY LEPTONS
See also TAU PARTICLES
Particle Identification
TOF for heavy stable particle identification, 8:54722 (RA;US)
Particle Production
TOF for heavy stable particle identification, 8:54722 (RA;US)

HEAVY OILS
See PETROLEUM

HEBER GEOTHERMAL FIELD
Geothermal Power Plants
Heber Geothermal Binary Demonstration Project. Final design availability assessment. Revision 1, 8:53834 (R;US)

HEISSDAMPFREAKTORANLAGE
See HDR REACTOR

HELICOPTERS
Fuel Consumption
Fuel conservation evaluation of US Army helicopters. Part 5. Ah-1S flight testing. Final report, 31 July-21 September 1982, 8:54148 (R;US)
Performance Testing
Fuel conservation evaluation of US Army helicopters. Part 5. Ah-1S flight testing. Final report, 31 July-21 September 1982, 8:54148 (R;US)

HELIOSTATS
Design
Rim-drive cable-aligned heliostat collector system, 8:53825 (P;US)

HELIUM
Gettering
Self-pumping impurity by in-situ metal deposition, 8:55281 (R;US)
Removal
Self-pumping impurity by in-situ metal deposition, 8:55281 (R;US)

HELIUM 3
Specific Heat
Specific heat of ^{3}He in the Fermi-liquid region, 8:54764 (R;US)

HELIUM 4 REACTIONS
See ALPHA REACTIONS

HELIUM DILUTION REFRIGERATORS
Flowmeters
Helium-flow measurement using ultrasonic technique, 8:54633 (R;US)

HELIUM I
The phase of liquid helium-4 which is stable at temperatures above the lambda point (about 2.2 K).

Heat Transfer
Heat transfer to subcooled He I, 8:54522 (R;US)
Nucleate Boiling
Heat transfer to subcooled He I, 8:54522 (R;US)
HEVEA
Plant Diseases
Plant physiological isotope aided studies specific to rubber trees, 8:54992 (RA;XA)
Tracer Techniques
Use of isotopes for the study of Hevea and other tree crops, 8:54987 (RA;XA)
HIGGS BOSONS
Particle Widths
Observability of heavy Higgs bosons, 8:55156 (J;IT)
HIGH ENERGY PHYSICS
Use only for articles of a very broad nature such as an annual research program, etc.
Research Programs
High-energy physics progress report, 1983-1984, 8:55138 (R;US)
HIGH ENERGY RADIOTHERAPY
See RADIOTHERAPY
HIGH EXPLOSIVES
See CHEMICAL EXPLOSIVES
HIGH FLUX NEUTRON SOURCE FACILITY
See NEUTRON SOURCE FACILITIES
HIGH TEMPERATURE GAS COOLED AND GRAPHITE
See HTGR TYPE REACTORS
HIGH-FREQUENCY HEATING
See also ECR HEATING
Test Facilities
National rf test facility, 8:55270 (RA;US)
HIGH-LEVEL RADIOACTIVE WASTES
Packaging
Construction and inservice inspection rules for nuclear spent fuel and high-level waste transport packagings, 8:53568 (RA;US)
Design rules for containment systems of nuclear spent fuel and high-level waste transport packagings, 8:53570 (RA;US)
Development of waste package designs for disposal in a salt repository, 8:53639 (RA;US)
Rail Transport
Risk analysis of transporting vitrified high level radioactive waste by train (Borosilicate glass waste form), 8:53696 (RA;US)
Transport
Storage and transportation of spent fuel and high-level waste using dry storage casks, 8:53497 (RA;US)
Waste Transportation
Estimated transportation cost and risk for operation of a nuclear waste repository at candidate sites, 8:53555 (RA;US)
Transportation system preconceptual description for subseabed disposal of high-level waste, 8:53571 (RA;US)
HIGHLY ENRICHED URANIUM
80 - 100 per cent.
Packaging
Packaging of plutonium and high-enriched uranium safeguards samples for transport (Quartz vials and sealed canisters), 8:53524 (RA;US)
HIGH-PURITY GE DETECTORS
Telescope Counters
Variable geometry high-purity germanium detector telescope system for use with intermediate energy charged particles, 8:54748 (J;NL)
HIGH-TEMPERATURE FUEL CELLS
See also MOLTEN CARBONATE FUEL CELLS
Performance
Solid-oxide fuel-cell performance, 8:54120 (R;US)
Research Programs
Solid-oxide fuel cells, 8:54117 (R;US)
Solid Electrolytes
Solid-oxide fuel cells, 8:54117 (R;US)
Systems Analysis
Solid-oxide fuel-cell performance, 8:54120 (R;US)
HIGH-VOLTAGE PULSE GENERATORS
Design
High-voltage supply for neutron tubes in well-logging applications, 8:54783 (P;US)
Switching Circuits
IBEX - a pulsed power accelerator that generates no prepulse, 8:54566 (R;US)
HIGHWAYS
See ROADS
HILACS
Performance
Development and investigation of electromagnetic characteristics for modifications of accelerating structure of heavy ion linear accelerator, 8:54565 (R;SU;In Russian)
HINKLEY POINT-B REACTOR
Coolants
In-core flow measurement and calibration of gags using on-load instrumented stringers in a C.A.G.R. at Hinkley Point 'B', 8:53931 (R;XA)
HODOSCOPES
Phosphors
High energy electromagnetic shower position measurement by a fine grained scintillation hodoscope, 8:54716 (RA;US)
HORSES
Demography
Initial study of wild horse and burro demography: determination of pregnancy and lactation rates in various herds. Final report, 8:54908 (R;US)
HOSPITALS
Energy Conservation
Project to analyze the potential energy and cost savings of changes in the DHHS: minimum requirements of construction and equipment for hospital and medical facilities, 8:54136 (R;US)
Photovoltaic Power Plants
Solar-photovoltaic energy system for the G.N. Wilcox Memorial Hospital and Health Care Center, 8:53789 (RA;US)
HOT CELLS
Decommissioning
Decontamination and decommissioning of fuel reprocessing cells at the Idaho Chemical Processing Plant, 8:53619 (RA;US)
Decontamination
Decontamination and decommissioning of fuel reprocessing cells at the Idaho Chemical Processing Plant, 8:53619 (RA;US)
HOT GAS CLEANUP
Research Programs
Development of a hot-gas-cleanup system for integrated coal-gasification/molten-carbonate fuel-cell power plants. Quarterly progress report, April-June 1983, 8:54115 (R;US)
HOT LABS
Decommissioning
Decommissioning of a tritium contaminated laboratory, 8:53616 (RA;US)
HOT WATER HEATERS
See WATER HEATERS
HOUSES
Energy Conservation
Central heat pump units - problems of heat output control, 8:54129 (R;DE;In German)
Radiation Monitoring
Radon-222 and progeny measurements in typical east Tennessee residences, 8:54900 (J;GB)
Solar Water Heating
Influence of residential solar water heaters on electric-utility peak demand, 8:53811 (R;US)
HTGR TYPE REACTORS
See also AVR REACTOR
Coated Fuel Particles
Post-irradiation characterization and performance assessment of coated particle fuels, 8:53892 (BA;GB)
Containment Systems
Thermohydraulics in a high-temperature gas-cooled reactor primary loop during early phases of unrestricted core-heatup accidents, 8:53985 (R;US)
Economics
Economic evaluation of the steam-cycle high-temperature gas-cooled reactor, 8:53910 (R;US)

In Core Instruments
High temperature measurement by noise thermometry, 8:53881 (R;XA)
Loss of Coolant
Analysis of pressure drop accidents in high temperature gas-cooled reactors, 8:54038 (RA;JP;In Japanese)
Loss of Flow
Thermohydraulics in a high-temperature gas-cooled reactor primary loop during early phases of unrestricted core-heatup accidents, 8:53985 (R;US)
Power Generation
Economic evaluation of the steam-cycle high-temperature gas-cooled reactor, 8:53910 (R;US)
Pressure Vessels
Prestressed concrete reactor vessel research and development studies at the Oak Ridge National Laboratory, 8:53891 (BA;GB)
Reactor Instrumentation
Instrumentation of an HTR and its environmental conditions, 8:53884 (R;XA)
Instrumentation of steam cycle HTR's up to 900 MWe, 8:53885 (R;XA)
Task and the technique of temperature instrumentation of HTR's, 8:53878 (R;XA)
Reactor Protection Systems
Design of reactor protection systems for HTR plants generating electric power and process heat problems and solutions, 8:53888 (R;XA)
Temperature Measurement
Task and the technique of temperature instrumentation of HTR's, 8:53878 (R;XA)

HUGENHOLTZ-PINES THEORY
See HYDROGEN

HUMAN CELLS
See ANIMAL CELLS

HUMAN POPULATIONS
See also A-BOMB SURVIVORS
Biological Radiation Effects
Demographic model for performing site-specific health risk projections, 8:55059 (J;GB)
Delayed Radiation Effects
Assessment of the safety of spent fuel transportation in urban environs, 8:53553 (RA;US)
Evaluation
Evacuation emergency response model coupling atmospheric release advisory capability output, 8:54037 (R;US)
Mortality
Lung cancer mortality and indoor radon concentrations in 18 Canadian cities, 8:55035 (RA;US)
Radiation Doses
Benchmarking of RADTRAN II, 8:53486 (RA;US)
Optimization of radiation protection in the transportation of radioisotopes, 8:53693 (RA;US)
Performance assessment of a shaft seals system in a HLW repository in the Gibson Dome area, 8:53673 (R;US)
Potential problems from shipment of high-curie content contact-handled transuranic (CH-TRU) waste to WIPP, 8:53580 (R;US)
Radiation exposure resulting from the transport of radioactive materials within the United Kingdom, 8:53701 (RA;US)
Radiation exposure due to railway transport of radioactive materials, 8:53704 (RA;US)
Sampling strategies for indoor radon investigations, 8:54897 (RA;US)
Truck transportation in the nuclear fuel cycle, 8:53523 (RA;US)
Worlwide risk assessment on the transportation of radioactive materials, 8:53489 (RA;US)
Radiation Hazards
Generic evaluation of the radiological impacts of transportation within the nuclear fuel cycle, 8:53498 (RA;US)

HUMANS
See HUMAN POPULATIONS

HUMIDITY
Research Programs
Applications of neutron moisture depth probes in tree research, 8:54989 (RA;XA)

HYDRAULIC EQUIPMENT
Design
Mathematical modeling of high velocity water jets, 8:54487 (BA;US)
Fluid Flow
Techniques for the measurement of the air-water distribution in the flowfield of a high velocity water jet, 8:54488 (BA;US)

HYDRAULIC RAMS
See PUMPS

HYDROCARBONS
See also ALKANES
ALKENES
ANTHRACENE
BENZENE
NAPHTHALENE
POLYCYCLIC AROMATIC HYDROCARBONS
Combustion
Modeling of hydrocarbon fires. Subreport No. 1, 8:53739 (R;US)
Fires
Modeling of hydrocarbon fires. Subreport No. 1, 8:53739 (R;US)

HYDRODYNAMICS
Response Functions
Backflow in two and three dimensions, 8:55121 (R;XA)

HYDROELECTRIC POWER PLANTS
Control Systems
Automatic generation controller for Flatiron Dispatch Center-Laramie River Power station remote terminal unit, 8:53753 (R;US)
Financial Incentives
Hydroelectric development in Hawaii, 8:53752 (RA;US)
Pumped Storage
Ondergrondse pomp accumulatie centrale in nederland: vooronderzoek (Pumped Storage hydroelectric plants with underground reservoirs in the Netherlands: preliminary report), 8:53754 (R;US)
Retrofitting
Hydroelectric development in Hawaii, 8:53752 (RA;US)

HYDROGEN
Atom-Molecule Collisions
Kinetics of elementary atom and radical reactions. Progress report (O atom + H molecule.), 8:55111 (R;US)
Breakdown
Isotope dependence of the breakdown strength of gases, 8:55109 (R;US)
Chemical Reactions
Ionic hydrogen bond. 3. Multiple NH^+...O and CH/sup $\delta/^+$...O bonds. Complexes of ammonium ions with polyethers and crown ethers, 8:54322 (J;US)
Theoretical studies of the potential surface for the reaction $C(^3P) + H_2 \rightarrow CH_2(^3B_1)$, 8:54365 (J;US)
Consumption Rates
Dependence of liquefaction behavior on coal characteristics. Part IV. Contributions to the understanding of the phenomenology of coal liquefaction. Final technical report, March 1981-February 1984, 8:53342 (R;US)
Ion Beams
Production of intensive beams of hydrogen anions, 8:55323 (TG;DE;In German)
Ion Sources
Production of intensive beams of hydrogen anions, 8:55323 (TG;DE;In German)
Ion-Atom Collisions
Atomic-orbital expansion model for describing ion-atom collisions at intermediate and low energies, 8:55107 (R;US)
Metallurgical Effects
Fatigue crack growth and fracture resistance of steels in high-pressure hydrogen environments. Final report, 8:54211 (R;XE)
Nuclear Magnetic Resonance
New developments and opportunities in NMR in metal-hydrogen systems, 8:55218 (R;US)

Structural Chemical Analysis
Ionic hydrogen bond. 2. Intramolecular and partial bonds. Protonation of polyethers, crown ethers, and diketones, 8:54321 (J;US)
Transport
Chemical/hydrogen energy systems multi-year R and D plan, 8:53734 (R;US)
Design calculations for a gas pipeline for the transport of solar-produced hydrogen over large distances taking non-stationary operating conditions into account, 8:53737 (TG;US)

HYDROGEN 1 MINUS BEAMS
Polarized Beams
AGS polarized proton project, 8:54597 (R;US)

HYDROGEN 2
See DEUTERIUM

HYDROGEN 3
See TRITIUM

HYDROGEN FUEL CELLS
Uses
Development of a solar-energy system. First annual report, 8:53770 (R;US)

HYDROGEN FUELS
Economics
Hydrogen in energy, 8:53733 (RA;US)
Technology Assessment
Hydrogen in energy, 8:53733 (RA;US)

HYDROGEN HYDROXIDES
See WATER

HYDROGEN IONS
See also HYDROGEN IONS 1 MINUS
HYDROGEN IONS 1 PLUS
Ion Spectroscopy
100% alignment of hydrogen excited states in beam-foil spectroscopy, 8:55108 (R;US)
Spin Orientation
100% alignment of hydrogen excited states in beam-foil spectroscopy, 8:55108 (R;US)

HYDROGEN IONS 1 MINUS
For H_1^- ions.
Ion Sources
Theoretical studies of kinetic mechanisms of negative ion formation in plasmas. Final technical report 15 Jan 81-15 Jan 83, 8:55104 (R;US)

HYDROGEN IONS 1 PLUS
For H_1^+ ions.
Ion-Atom Collisions
Atomic-orbital expansion model for describing ion-atom collisions at intermediate and low energies, 8:55107 (R;US)

HYDROGEN ISOTOPES
See also DEUTERIUM
TRITIUM
Gaseous Diffusion Process
Study of mechanism of hydrogen diffusion in separation devices. Progress report for 1980-1983, 8:53730 (R;US)

HYDROGEN LOGS
See NEUTRON LOGGING
NEUTRON-NEUTRON LOGGING

HYDROGEN MINUS 1 BEAMS
See HYDROGEN 1 MINUS BEAMS

HYDROGEN PRODUCTION
Photolysis of water vapor on titanium/TiO_2 surfaces, 8:54341 (J;NL)
Biophotolysis
Solar production of hydrogen. A biological approach, 8:53736 (J;US)
Biosynthesis
Solar production of hydrogen. A biological approach, 8:53736 (J;US)
Electrolysis
Chemical/hydrogen energy systems multi-year R and D plan, 8:53734 (R;US)
Photochemical Reactions
Electrochemical characterization of p-type semiconducting tungsten disulfide photocathodes: efficient photoreduction processes at semiconductor/liquid electrolyte interfaces, 8:53784 (J;US)
Photoelectrochemical Cells
Development of a solar-energy system. First annual report, 8:53770 (R;US)
Photolysis
Kinetics of hydrogen production from methyl viologen radicals on colloidal platinum, 8:53735 (J;US)
Research Programs
Chemical/hydrogen energy systems multi-year R and D plan, 8:53734 (R;US)

HYDROGEN STORAGE
Materials Testing
Comparison of the various test methods for studying the hydrogen sensitivity of steels used for storage and transport of hydrogen gas. Final report, June 1, 1980-November 30, 1982, 8:54246 (TG;US)
Research Programs
Chemical/hydrogen energy systems multi-year R and D plan, 8:53734 (R;US)

HYDROGENATION
Catalysts
Solvent tailoring in coal liquefaction. Quarterly report, August 1982-November 1982, 8:53339 (R;US)
Simulation
Solvent tailoring in coal liquefaction. Quarterly report, August 1982-November 1982, 8:53339 (R;US)
Volatility
Solvent tailoring in coal liquefaction. Quarterly report, August 1982-November 1982, 8:53339 (R;US)

HYDROGEN-BASED ECONOMY
Feasibility Studies
Hydrogen in energy, 8:53733 (RA;US)

HYDROLOGY
Surface hydrology study, 8:53669 (RA;US)
Monitoring
Surface mining environmental monitoring and reclamation handbook (Book), 8:53400 (R;US)

HYDROXYBENZENE
See PHENOL

HYDROXYNAPHTHALENES
See NAPHTHOLS

HYGAS PROCESS
Monitoring
Engineering-support services for the DOE/GRI coal-gasification research program. Monthly technical progress report, 27 February-26 March 1982, 8:53335 (R;US)
Pilot Plants
Engineering-support services for the DOE/GRI coal-gasification research program. Monthly technical progress report, 27 February-26 March 1982, 8:53335 (R;US)

HYPERONS
See also ANTIHYPERONS
Particle Production
Hyperon production in nC interactions in the neutron beam with approximately 40 GeV/c momentum, 8:55139 (R;SU;In Russian)

HYPERTHERMIA
Biological Effects
Microwaves, hyperthermia, and human leukocyte function. Final report, August 1979-June 1982, 8:55072 (R;US)

I

IBR-2 REACTOR
Reactor Control Systems
System for correlational and spectral measurements of IBR-2 reactor parameters, 8:53940 (R;SU;In Russian)

IDAHO CHEMICAL PROCESSING PLANT
Chemical Effluents
Determination of baseline levels of toxic nonradioactive substances at the ICPP, 8:53648 (R;US)

Hot Cells
Decontamination and decommissioning of fuel reprocessing cells at the Idaho Chemical Processing Plant, 8:53619 (RA;US)
Radioactive Effluents
ICPP 1st-quarter 1983 effluent-monitoring report. Supplement 1, 8:53646 (R;US)
Waste Disposal
ICPP 1st-quarter 1983 effluent-monitoring report. Supplement 1, 8:53646 (R;US)

IDENTIFICATION SYSTEMS
Materials Testing
Durability of marker materials for nuclear waste isolation sites, 8:53670 (R;US)

IGNITION
Mathematical Models
Transient ignition in a flat plate boundary layer, 8:54363 (RA;US)

IGT HYDROGASIFICATION PROCESS
See HYGAS PROCESS

ILLINOIS
Energy
Energy for Illinois. Final report, 8:54192 (R;US)

ILLUMINATION SYSTEMS
See LIGHTING SYSTEMS

IMAGES
Evaluation
Image analysis of chest radiographs. Final report, 8:54976 (R;US)

IMPACT TESTS
Planar flyer plate driven by detonation product convergent flow, 8:54849 (RA;US)
Test Facilities
Drop test facility available to private industry, 8:54402 (RA;US)

IMPINGEMENT
Mathematical Models
Impingement of threadfin shad: effects of temperature and hydrography, 8:53862 (J;US)
Temperature Effects
Impingement of threadfin shad: effects of temperature and hydrography, 8:53862 (J;US)

IMPURITIES
Unwanted constituents, not for TRACE AMOUNTS, INTERFERING ELEMENTS, or metal and nonmetal additions.
Gettering
Self-pumping impurity by in-situ metal deposition, 8:55281 (R;US)
Removal
Self-pumping impurity by in-situ metal deposition, 8:55281 (R;US)

INCINERATION
See COMBUSTION

INCINERATORS
Cost
Evaluation of a small, inexpensive incinerator for institutional radioactive waste, 8:53685 (J;GB)
Evaluation
Evaluation of a small, inexpensive incinerator for institutional radioactive waste, 8:53685 (J;GB)
Heat Recovery
Parametric examination of the heat recovery incinerators at NAS (Naval Air Station), Jacksonville. Report for Oct 81-Sep 82, 8:54157 (R;US)
Operation
Cyclone incinerator: operating experience, 8:53651 (R;US)
Performance
Cyclone incinerator: operating experience, 8:53651 (R;US)

INCLUSIONS
Ultrasonic 3-D reconstruction of inclusions in solids using the inverse Born algorithm, 8:54533 (R;US)

INCONEL 600
Chemical Composition
Corrosion response of downhole steam generator assembly and instrumentation and supply line tubings at Long Beach field test, 8:53434 (R;US)
Corrosion
Characterization of Alloy 600 surfaces after exposure to a caustic environment, 8:54208 (R;US)
Corrosion response of downhole steam generator assembly and instrumentation and supply line tubings at Long Beach field test, 8:53434 (R;US)
Ultimate Strength
Corrosion response of downhole steam generator assembly and instrumentation and supply line tubings at Long Beach field test, 8:53434 (R;US)
Yield Strength
Corrosion response of downhole steam generator assembly and instrumentation and supply line tubings at Long Beach field test, 8:53434 (R;US)

IN-CORE FUEL MANAGEMENT
See FUEL MANAGEMENT

INCORPORATION (BIOLOGICAL)
See UPTAKE

INDIA
Coal Industry
Metallurgical coal in the 1980's - facts and prospects, 8:53423 (R;US)
Natural Radioactivity
Background radioactivity in the monazite areas of Kerala, India, 8:54924 (R;DE)
Personnel Dosimetry
Background radioactivity in the monazite areas of Kerala, India, 8:54924 (R;DE)
Water Quality
Trace metals in tropical river environment--distribution, 8:54945 (J;NL)
Trace metals in tropical river environment--speciation and biological transfer, 8:54946 (J;NL)

INDIUM
Thermal Conductivity
Analysis of thermal conductivity data for fourteen elements in normal and superconducting states. State-of-the-art report, 8:54206 (R;US)
Transition Temperature
Analysis of thermal conductivity data for fourteen elements in normal and superconducting states. State-of-the-art report, 8:54206 (R;US)

INDIUM PHOSPHIDES
Crystal Defects
Deep level defects in semiconductors. Final technical report 1 Jul 78-30 Jun 80, 8:54271 (R;US)

INDOOR AIR POLLUTION
Health Hazards
Issue backgrounder: the health impacts of home weatherization, 8:54134 (R;US)

INDUCED RADIOACTIVITY
See RADIOACTIVITY

INDUCTION GENERATORS
Computerized Simulation
Investigation of small wind-turbine induction generators. Final technical report, September 16, 1980-December 31, 1982, 8:53846 (R;US)
Performance Testing
Investigation of small wind-turbine induction generators. Final technical report, September 16, 1980-December 31, 1982, 8:53846 (R;US)

INDUSTRIAL PLANTS
See also COAL GASIFICATION PLANTS
COAL LIQUEFACTION PLANTS
COAL PREPARATION PLANTS
ETHANOL PLANTS
FEED MATERIALS PLANTS
METHANOL PLANTS
OIL SHALE PROCESSING PLANTS
PETROLEUM REFINERIES
Energy Conservation
Industrial electricity conservation potential in the Pacific Northwest. Final report. Volume II. Appendices, 8:54181 (R;US)
Radioactive Effluents
Natural radioactivity in the production of titanium dioxide pigment: a study of the Laporte plant and environmental

behaviour of radionuclides at Bunbury, Western Australia, 8:54921 (RA;AU)

INDUSTRIAL RADIOGRAPHY
See also BIOMEDICAL RADIOGRAPHY.
See also X-RAY RADIOGRAPHY
Proton Beams
Proton nuclear scattering radiography, 8:54971 (R;FR)
Radiation Doses
Occupational radiation exposures in Canada - 1979, 8:55040 (R;CA;In English, French)

INDUSTRIAL SECTOR
See INDUSTRY

INDUSTRY
See also CERAMICS INDUSTRY
CHEMICAL INDUSTRY
COAL INDUSTRY
ELECTRIC POWER INDUSTRY
FISHING INDUSTRY
FOOD INDUSTRY
GLASS INDUSTRY
METAL INDUSTRY
MINERAL INDUSTRY
NATURAL GAS INDUSTRY
NUCLEAR INDUSTRY
OIL SAND INDUSTRY
PETROLEUM INDUSTRY
TEXTILE INDUSTRY
WOOD PRODUCTS INDUSTRY
Energy Conservation
Conservation of energy resources, 8:54147 (B;US)
Industrial-electricity-conservation potential in the Pacific Northwest. Volume I. Final report, 8:54180 (R;US)
Technical review, volume 19, number 3, serial number 55, October 1982 (Mitsubishi Heavy Industries), 8:54168 (R;US)
Waste Heat
Industrial waste heat for district heating, 8:54075 (J;US)

INERTIAL CONFINEMENT
A dynamic plasma confinement by inertial forces.
Chemical Lasers
Summary report: laser candidates for inertial fusion, 8:55288 (R;US)

INFORMATION SYSTEMS
Data Base Management
Problems involved in the computer identification of replicate entries in TOXLINE, 8:55330 (R;US)

INFORMATION THEORY
Data Processing
Data compression methods in problems of experimental nuclear physics, 8:55115 (R;SU;In Russian)

INHIBITORS (ENZYME)
See ENZYME INHIBITORS

INORGANIC ACIDS
Chemical Reactions
Facile reaction/extraction of coal with supercritical fluids. Quarterly technical progress report, April 1, 1983-June 30, 1983 (In Benzene), 8:53344 (R;US)
Solubility
Facile reaction/extraction of coal with supercritical fluids. Quarterly technical progress report, April 1, 1983-June 30, 1983 (In Benzene), 8:53344 (R;US)

INSECTS
Morphological Changes
Use of the cricket embryo (Acheta domesticus) as an invertebrate teratology model, 8:55069 (R;US)

IN-SITU COMBUSTION
Waste Water
Physical-chemical treatment of tar-sand processing wastewater, 8:53462 (R;US)

IN-SITU GASIFICATION
Bench-Scale Experiments
Laboratory test procedure to determine the mobilization of trace elements and other pollutants during in-situ coal gasification, 8:53351 (R;US)
Chemical Effluents
Laboratory test procedure to determine the mobilization of trace elements and other pollutants during in-situ coal gasification, 8:53351 (R;US)
Pollutants
Laboratory test procedure to determine the mobilization of trace elements and other pollutants during in-situ coal gasification, 8:53351 (R;US)
Pollution Control
Laboratory test procedure to determine the mobilization of trace elements and other pollutants during in-situ coal gasification, 8:53351 (R;US)

INSOLATION
Data Acquisition
Review of potential satellite techniques for mesoscale mapping of insolation, 8:53759 (R;US)

INSULATING LIMITERS
See LIMITERS

INSULATORS (ELECTRICAL)
See ELECTRICAL INSULATORS

INTEGRATED CIRCUITS
Physical Radiation Effects
Total-dose radiation-effects data for semiconductor devices. Vol. 2, 8:54760 (R;US)

INTERCONNECTED POWER SYSTEMS
Demonstration Programs
Hawaii Deep-Water Cable Program: electrical-grid-system integration investigations, 8:54093 (RA;US)
Disturbances
Coherency for interconnected power systems, 8:53866 (J;US)
Electric Cables
Hawaii Deep-Water Cable Program: electrical-grid-system integration investigations, 8:54093 (RA;US)
Underwater Operations
Hawaii Deep-Water Cable Program: electrical-grid-system integration investigations, 8:54093 (RA;US)
Wind Turbines
Commercial wind energy conversion systems (wecs) monitoring and utility impacts study. Final report, 8:53850 (R;US)

INTERFACES
Raman Spectroscopy
Photon scattering and interaction analysis for interfacial corrosion and catalysis. Technical progress report, September 1, 1982-August 31, 1983, 8:54048 (R;US)

INTERMEDIATE VECTOR BOSONS
Mass
Search for right-handed currents in muon decay, 8:55134 (R;US)
Particle Decay
Search for hadron jets and large transverse momentum electrons at the SPS anti p p collider, 8:55140 (RA;US)

INTERMEDIATE-LEVEL RADIOACTIVE WASTES
Vitrification
Study of borate-phosphate system for fixation of nuclear power plant wastes, 8:53682 (R;CS;In Czech)

INTERMETALLIC COMPOUNDS
Physical Radiation Effects
Crystalline-amorphous transition in NiTi alloys induced by high-energy electron irradiation, 8:54234 (RA;US)

INTERNAL COMBUSTION ENGINES
See also DIESEL ENGINES
ROTARY ENGINES
Fuel-Air Ratio
Effect of volatility on air-fuel ratio distribution and torque output of a carbureted light aircraft piston engine. Final report, May 1981-September 1982, 8:54197 (R;US)

INTERNAL CONTAMINATION
See RADIONUCLIDE KINETICS

INTERNATIONAL NUCLEAR DATA COMMITTEE
Indexes
INDC correspondents for the exchange of nuclear data information, 8:55163 (R;XA)
Meetings
Fifth research coordination meeting on the measurement and evaluation of transactinium isotope nuclear data. Central Bureau for Nuclear Measurements, Geel, Belgium, 1-3 September 1982. Summary report, 8:55195 (R;XA)
IAEA advisory group meeting on nuclear structure and decay data, Zeist, The Netherlands, 11-14 May 1982. Summary report, 8:55162 (R;XA)
Minutes of the twelfth INDC meeting, Vienna, 5-9 October 1981, 8:55161 (R;XA)

INTERNATIONAL TOKAMAK REACTOR
See INTOR TOKAMAK
INTERSECTING BEAMS
See COLLIDING BEAMS
INTERSECTING STORAGE ACCELERATOR
See ISABELLE STORAGE RINGS
INTOR TOKAMAK
International Tokamak Reactor.
Shielding
US INTOR radiation-shield design, 8:55262 (R;US)
INVENTORIES
Computer Calculations
Time-series models with many discrete alternatives, 8:55342 (R;US)
Time-Series Analysis
Time-series models with many discrete alternatives, 8:55342 (R;US)
IODINATED AROMATIC HYDROCARBONS
Structural Chemical Analysis
Regiospecific incorporation of bromine and iodine into phenols using (trimethylsilyl)phenol derivatives, 8:54333 (J;US)
Synthesis
Regiospecific incorporation of bromine and iodine into phenols using (trimethylsilyl)phenol derivatives, 8:54333 (J;US)
IODINE
Activation Analysis
Elemental composition of human and animal milk. A review. A report prepared under the auspices of the IAEA in collaboration with the WHO, 8:54983 (R;XA)
Chemical Reactions
Regiospecific incorporation of bromine and iodine into phenols using (trimethylsilyl)phenol derivatives, 8:54333 (J;US)
IODINE 127
Isotope Ratio
Iodine-129 in mule deer thyroids in the Rocky Mountain west, 8:54930 (J;GB)
Radioecological Concentration
Comparative behavior of ^{99}Tc, ^{129}I, ^{127}I and ^{137}Cs in the environment adjacent to a fuels reprocessing facility, 8:54928 (J;GB)
Spatial Distribution
Comparative behavior of ^{99}Tc, ^{129}I, ^{127}I and ^{137}Cs in the environment adjacent to a fuels reprocessing facility, 8:54928 (J;GB)
IODINE 127 TARGET
Neutron Reactions
Parity nonconservation in neutron resonances (0.88 eV ^{81}Br, 4.53 eV ^{111}Cd, 1.33 eV ^{117}Sn, 0.75 eV ^{139}La neutron resonances), 8:55180 (R;SU;In Russian)
Search for radiative capture of neutrons in nuclei stimulated by the electric field of a laser wave, 8:55186 (R;SU;In Russian)
IODINE 129
Isotope Ratio
Iodine-129 in mule deer thyroids in the Rocky Mountain west, 8:54930 (J;GB)
Mass Spectroscopy
Determination of low specific activity iodine-129 off-gas concentrations by GC separation and negative ionization mass spectrometry, 8:53647 (R;US)
Radioecological Concentration
Comparative behavior of ^{99}Tc, ^{129}I, ^{127}I and ^{137}Cs in the environment adjacent to a fuels reprocessing facility, 8:54928 (J;GB)
Spatial Distribution
Comparative behavior of ^{99}Tc, ^{129}I, ^{127}I and ^{137}Cs in the environment adjacent to a fuels reprocessing facility, 8:54928 (J;GB)
Uptake
Iodine-129 uptake and effects of lifetime feeding in rats, 8:55057 (J;GB)
IODINE 131
Biological Radiation Effects
Thyroid cancer from occupational exposures to iodine-131, 8:55011 (RA;US)
Isotopic Exchange
Regiospecific incorporation of bromine and iodine into phenols using (trimethylsilyl)phenol derivatives, 8:54333 (J;US)
IODINE IODIDES
See IODINE
IODINE ISOTOPES
See also IODINE 127
IODINE 129
IODINE 131
Solidification
Immobilization of radioiodine in synthetic boracite, 8:53688 (P;US)
ION BEAM TARGETS
Stopping Power
Beam-target interaction of intense ion beams: theory and experiment, 8:55304 (R;US)
Ion stopping in heated targets, 8:55302 (R;US)
ION BEAMS
See also HYDROGEN I MINUS BEAMS
Charge Exchange
Beam loss in accumulation ring due to charge transfer and ionization processes, 8:54638 (RA;JP)
ION IMPLANTATION
Annealing
Characterization of excimer laser annealing of ion implanted Si, 8:54283 (J;US)
ION MICROPROBE ANALYSIS
Uses
Investigation of impurity concentrations and electrical properties near interfaces. Final report 1 Feb 81-31 Aug 82, 8:55102 (R;US)
ION SOURCES
See also PENNING ION SOURCES
Ampfion hybrid diodes on Hydramite and PBFA-I, 8:55297 (R;US)
Applied-B ion diode experiments on PBFA I, 8:55299 (R;US)
Decoupling ion efficiency from impedance in pulsed-power diodes, 8:55294 (R;US)
Light-ion-beam fusion, 8:55305 (R;US)
Diagnostic Techniques
Using inner-shell x-rays as an ion-beam diagnostic, 8:55301 (R;US)
Measuring Methods
Diagnosing the ion beam on the Applied-B diode, 8:55300 (R;US)
Plasma Sheath
Analysis of mechanisms for anode plasma formation in ion diodes, 8:55296 (R;US)
Research Programs
Overview of ion-diode research, 8:55298 (R;US)
X Radiation
Using inner-shell x-rays as an ion-beam diagnostic, 8:55301 (R;US)
IONIZATION CALORIMETERS
See SHOWER COUNTERS
IONIZATION CHAMBERS
See also FISSION CHAMBERS
Corrections
Correction for the effect of humidity in free air ionisation chambers for x-rays other than those generated at 50 kV, 8:54661 (RA;AU)
Hygrometry
Correction for the effect of humidity in free air ionisation chambers for x-rays other than those generated at 50 kV, 8:54661 (RA;AU)
Specifications
Characteristics of ionization chambers filled with nitrogen, 8:54677 (R;SU;In Russian)
IONIZING RADIATIONS
See also GAMMA RADIATION
X RADIATION
Biological Radiation Effects
Cancer mortality at a naval nuclear shipyard, 8:55010 (RA;US)
DOE health and mortality study at Oak Ridge, 8:55009 (RA;US)
Methodologic assessment of radiation epidemiology studies, 8:55006 (RA;US)
Mortality among workers at the Oak Ridge National Laboratory, 8:55008 (RA;US)

Delayed Radiation Effects
Development of cancer risk estimates from epidemiologic studies, 8:55024 (RA;US)
Health Hazards
Radiation risks and benefits: politics and morality, 8:55004 (RA;US)
Risk Assessment
Considerations in using radiation dosimetry data in epidemiologic studies, 8:55018 (RA;US)
Epidemiology applied to health physics, 8:55003 (R;US)
Model or metaphor. More comments on the BEIR III report, 8:55028 (RA;US)
New NRC methodology for estimating biological risks from exposure to ionizing radiation, 8:55019 (RA;US)
Relative and absolute risk in epidemiology and health physics, 8:55023 (RA;US)
Some statistical considerations related to the estimation of cancer risk following exposure to ionizing radiation, 8:55007 (RA;US)
Utilization of epidemiological data in the development of radiation protection recommendations, 8:55017 (RA;US)

IONOSPHERE
See also E REGION
F REGION
Electron Beams
Plasma wave turbulence and particle heating caused by electron beams, radiation, and pinches. Annual interim report 1 Oct 81-30 Sep 82, 8:55097 (R;US)

IOWA
Air Quality
Iowa air quality report 1981. Annual report, 8:54882 (R;US)

IRIDIUM HYDRIDES
Magnetic Susceptibility
Structure and magnetism of Eu_3IrD_5, 8:54241 (J;US)
Structural Chemical Analysis
Structure and magnetism of Eu_3IrD_5, 8:54241 (J;US)

IRON
Activation Analysis
Elemental composition of human and animal milk. A review. A report prepared under the auspices of the IAEA in collaboration with the WHO, 8:54983 (R;XA)
Catalytic Effects
Effects of potassium promotion on the activity and selectivity of iron Fischer-Tropsch catalysts, 8:54319 (J;US)
Corrosion
Durability of marker materials for nuclear waste isolation sites, 8:53670 (R;US)
Ecological Concentration
Incidence of heavy metals in street surface sediments: solubility and grain size studies, 8:54917 (J;NL)
Fischer-Tropsch Synthesis
Effects of potassium promotion on the activity and selectivity of iron Fischer-Tropsch catalysts, 8:54319 (J;US)
Ion Pairs
Magnetic, Moessbauer effect, and neutron small angle scattering measurements on iron clusters in A-zeolites, 8:54214 (R;DE;In German)
Materials Recovery
Mineral recovery from coal-conversion solid wastes, 8:53387 (R;US)
Proton Reactions
Deuteron production in proton-nucleus interactions at 7.5 GeV/c, 8:55183 (R;SU;In Russian)
Service Life
Durability of marker materials for nuclear waste isolation sites, 8:53670 (R;US)
Weathering
Durability of marker materials for nuclear waste isolation sites, 8:53670 (R;US)

IRON 56 TARGET
Argon 40 Reactions
Calculation of fusion cross sections, 8:55175 (R;DD;In German)
Neon 22 Reactions
Calculation of fusion cross sections, 8:55175 (R;DD;In German)
Nitrogen 14 Reactions
Calculation of fusion cross sections, 8:55175 (R;DD;In German)

IRON 57
Moessbauer Effect
Moessbauer spectroscopy study of amorphous $Fe_{77}B_{11}Au_8$ ribbon and its crystallization products, 8:54216 (R;US)

IRON ALLOYS
See also INCONEL 600
IRON BASE ALLOYS
Physical Radiation Effects
Disordering under HVEM irradiation (Ni_3Al; Ni_3Fe; NiAl; FeAl), 8:54224 (RA;US)
Swelling of high-nickel Fe-Ni-Cr alloys in EBR-II (Contribution to DAFS quarterly), 8:53929 (R;US)
Recrystallization
Moessbauer spectroscopy study of amorphous $Fe_{77}B_{11}Au_8$ ribbon and its crystallization products, 8:54216 (R;US)

IRON BASE ALLOYS
See also CAST IRON
STEELS
Microstructure
HVEM studies of precipitate morphology symmetries (Fe-Cu; Cu-Cr; Fe-N), 8:54225 (RA;US)
Physical Radiation Effects
Comparison of the effect of electron and ion irradiation on crystallization of amorphous alloys (62Fe16Cr8Ni14W; 50Mo50Ni), 8:54235 (RA;US)
Disordering under HVEM irradiation (Ni_3Al; Ni_3Fe; NiAl; FeAl), 8:54224 (RA;US)
Self-Diffusion
Study of iron self-diffusion in gamma-phase field of iron-chromium binary system, 8:54213 (R;SU;In Russian)

IRON COMPLEXES
Chemical Reaction Yield
Bimetallic anionic formyl complexes: synthesis and properties, 8:54331 (J;US)
Electronic Structure
Concerning the electronic structure of the ions $M(bpy)_3^{2+}$ (M = Fe, Ru, Os; bpy = 2,2'-bipyridine), 8:54330 (J;US)
Excitation
Concerning the electronic structure of the ions $M(bpy)_3^{2+}$ (M = Fe, Ru, Os; bpy = 2,2'-bipyridine), 8:54330 (J;US)
Photochemical Reactions
Photochemistry of mixed-metal bimetalic complexes containing pentacyanoferrate(II) or pentaammineruthenium(II) metal centers. Evidence for some intramolecular energy-transfer reactions, 8:54340 (J;US)
Photochemistry
Photochemistry of mixed-metal bimetalic complexes containing pentacyanoferrate(II) or pentaammineruthenium(II) metal centers. Evidence for some intramolecular energy-transfer reactions, 8:54340 (J;US)
Redox Reactions
Quantum effects of high-frequency modes in inorganic electron transfer: kinetic isotope effects in redox reactions of $[Fe(H_2O)_6]^{2+}$, $[Fe(D_2O)_6]^{2+}$, and $Fe[(^{18}OH_2)_6]^{2+}$, 8:54310 (J;US)
Structural Chemical Analysis
Photoelectron spectroscopic study of the bonding in tetracarbonyl(ethylene)iron, 8:54309 (J;US)
Visible Spectra
Photochemistry of mixed-metal bimetalic complexes containing pentacyanoferrate(II) or pentaammineruthenium(II) metal centers. Evidence for some intramolecular energy-transfer reactions, 8:54340 (J;US)

IRON COMPOUNDS
See also IRON OXIDES
Chemical Reactions
Bimetallic anionic formyl complexes: synthesis and properties, 8:54331 (J;US)
Redox Reactions
Quantum effects of high-frequency modes in inorganic electron transfer: kinetic isotope effects in redox reactions of $[Fe(H_2O)_6]^{2+}$, $[Fe(D_2O)_6]^{2+}$, and $Fe[(^{18}OH_2)_6]^{2+}$, 8:54310 (J;US)

IRON IONS
Ion Exchange
Magnetic, Moessbauer effect, and neutron small angle scattering measurements on iron clusters in A-zeolites, 8:54214 (R;DE;In German)
IRON OXIDES
See also MAGNETITE
Catalytic Effects
Catalytic fluidized-bed combustion. Enhancement of sulfation of calcium oxide by iron oxide, 8:54367 (J;US)
Experimental studies on the control of hydrocarbons emission from a gasifier. Final report, September 1981-February 1983, 8:53337 (R;US)
Solid-state, surface, and catalytic properties of oxides. Progress report, October 1, 1982-August 31, 1983, 8:54306 (R;US)
Structural Chemical Analysis
Additional observations on the ferric ion (Fe^{3+}) content of melt-grown fayalite (Fe_2SiO_4), 8:54287 (J;US)
IRON-NICKEL BATTERIES
Comparative Evaluations
Comparative response of lead-acid and nickel/iron batteries to pulsed and constant-current loads, 8:54046 (R;US)
Performance Testing
Comparative response of lead-acid and nickel/iron batteries to pulsed and constant-current loads, 8:54046 (R;US)
Technology Assessment
Application features and considerations in advanced lead-acid and nickel/iron EV batteries, 8:54047 (R;US)
IRRIGATION
Mathematical Models
Heavy water tracing of soil-water transfers under irrigation, 8:54964 (J;US)
ISABELLE
See ISABELLE STORAGE RINGS
ISABELLE STORAGE RINGS
Magnetic Fields
Warm measurements of CBA superconducting magnets, 8:54576 (R;US)
Radiation Detectors
Experience with high luminosity running at the CERN ISR, 8:54727 (RA;US)
Spectrometers
Experience of the axial field spectrometer at the CERN ISR, 8:54707 (RA;US)
Superconducting Magnets
Magnetic field measurements of superconducting magnets for the colliding beam accelerator, 8:54632 (R;US)
ISING MODEL
Antiferromagnetism
Universality and fractal dimension of mode locking structure in systems with competing periodicities, 8:55217 (R;US)
Mode Locking
Universality and fractal dimension of mode locking structure in systems with competing periodicities, 8:55217 (R;US)
ISOTOPES
See also HYDROGEN ISOTOPES
IODINE ISOTOPES
RADIOISOTOPES
Research Programs
Report of the Central Institute for Isotope and Radiation Research, 8:53729 (R;DD)
Report of the Central Institute for Isotope and Radiation Research, 8:53728 (R;DD)
ISX TOKAMAK
Beta Ratio
Review of the beta situation, 8:55236 (R;US)
ITALY
Dry Storage
Spent fuel dry-storage system for Trino Vercellese nuclear power plant, 8:53585 (BA;XN)

J

J-3105 RESONANCES
See PSI-3105 RESONANCES

JAILS
See PUBLIC BUILDINGS
JAPAN
Coal Industry
Metallurgical coal in the 1980's - facts and prospects, 8:53423 (R;US)
Dry Storage
Construction of JRR-3 spent fuel dry storage facility, 8:53592 (BA;XN)
Radioactivity
Radioactivity survey data in Japan, 8:54898 (R;JP)
Reactor Safety
List of reports concerning reactor safety research from BMFT, CEA, EPRI, JSTA, and USNRC, 8:54024 (R;DE;In German)
JAPAN FAST EXPERIMENTAL BREEDER REACTOR
See JOYO REACTOR
JAPAN MATERIALS TESTING REACTOR
See JMTR REACTOR
JAPAN POWER DEMONSTRATION REACTOR
See JPDR REACTOR
JAPAN RESEARCH REACTOR-2
See JRR-2 REACTOR
JAPAN RESEARCH REACTOR-4
See JRR-4 REACTOR
JAPANESE ORGANIZATIONS
Nuclear Physics
Nuclear physics experiment at INS, 8:55165 (R;JP)
Research Programs
Annual report of National Institute of Radiological Sciences of the fiscal year 1978, 8:55324 (R;JP;In Japanese)
Annual report of National Institute of Radiological Sciences of the fiscal year 1979, 8:55325 (R;JP;In Japanese)
JET DRILLS
Uses
Water jet drilling of long horizontal holes in coal beds, 8:53410 (BA;US)
JET ENGINE FUELS
Yields
Refining to high yields of jet fuel from shale oil. Final report, 8:53460 (R;US)
JETS
Design
Development of large-diameter percussive jets, 8:54489 (BA;US)
Fluidized-Bed Combustion
Fluidization in two-dimensional beds with a jet. 2. Hydrodynamic modeling, 8:54364 (J;US)
Mathematical Models
Mathematical modeling of high velocity water jets, 8:54487 (BA;US)
Uses
Development of large-diameter percussive jets, 8:54489 (BA;US)
JFER REACTOR
See JOYO REACTOR
JINR SYNCHROTRON
Beam Monitors
Plastic scintillation monitor for methodical investigation of track detectors on the JINR synchrophasotron, 8:54585 (R;SU;In Russian)
Demagnetization
Residual magnetic field in the magnet of the Dubna synchrophasotron and its compensation, 8:54584 (R;SU;In Russian)
Magnetic Fields
Residual magnetic field in the magnet of the Dubna synchrophasotron and its compensation, 8:54584 (R;SU;In Russian)
Performance
Dubna synchrophasotron. Operation and improvement (quarter 4, 1981), 8:54611 (R;SU;In Russian)
Dubna synchrophasotron. Operation and improvement (quarter 1, 1982), 8:54612 (R;SU;In Russian)

JMTR REACTOR
Reactor Cores
Reduced-enrichment fuel alternatives for the JAERI reactors, 8:53960 (R;US)
Reactor Kinetics
Reduced-enrichment fuel alternatives for the JAERI reactors, 8:53960 (R;US)
JOINTS
Mechanical joints only, not for BONE JOINTS.
See also WELDED JOINTS
Mechanical Tests
Hierarchical trees for accelerated aging studies, 8:54204 (R;US)
JOYO REACTOR
Containment Shells
Integrated leak rate test results of JOYO reactor containment vessel, 8:53975 (R;JP)
Failed Element Detection
Studies on modeling to failed fuel detection system response in LMFBR, 8:53977 (R;JP)
Failed Element Monitors
Operation experiences of JOYO fuel failure detection system, 8:53971 (R;JP)
Fuel Assemblies
Post irradiation examination of JOYO fuel subassemblies, 8:53972 (R;JP)
Fuel Element Clusters
Thermal and hydraulic experiments of JOYO fuel subassembly, 8:53973 (R;JP)
Operation
Nuclear reactor technology progress report, Volume 3. October - December, 1980, 8:53979 (R;JP;In Japanese)
Reactor Components
Material surveillance program of JOYO, 8:53970 (R;JP)
Reactor Noise
Reactor noise analysis of experimental fast reactor 'JOYO', 8:53899 (RA;JP;In Japanese)
Reactor Operation
JOYO reactor technology progress report, Volume 5. April - June 1981, 8:53981 (R;JP;In Japanese)
Nuclear reactor technology progress report, Volume 2. July-September 1980, 8:53978 (R;JP;In Japanese)
Nuclear reactor technology progress report, Volume 4. January - March, 1981, 8:53980 (R;JP;In Japanese)
Reactor Start-Up
Operating experiences and present activities of JOYO, 8:53969 (R;JP)
Seismic Effects
Field in situ vibration testing of JOYO heat transport system piping, 8:53974 (R;JP)
JPDR REACTOR
Reactor Decommissioning
JPDR decommissioning program, 8:54002 (RA;US)
Reactor Dismantling
JPDR decommissioning program, 8:54002 (RA;US)
JRR-2 REACTOR
Reactor Cores
Reduced-enrichment fuel alternatives for the JAERI reactors, 8:53960 (R;US)
Reactor Kinetics
Reduced-enrichment fuel alternatives for the JAERI reactors, 8:53960 (R;US)
JRR-4 REACTOR
Reactor Cores
Reduced-enrichment fuel alternatives for the JAERI reactors, 8:53960 (R;US)
Reactor Kinetics
Reduced-enrichment fuel alternatives for the JAERI reactors, 8:53960 (R;US)
JUNCTIONS (SEMICONDUCTOR)
See SEMICONDUCTOR JUNCTIONS

K

KAHL-MAIN REACTOR
See HDR REACTOR
KANSAS
Salt Deposits
Environmental characterization of bedded salt formations and overlying areas of the Permian Basin, 8:53689 (R;US)
KAOLINITE
X-Ray Diffraction
Data base for the analysis of compositional characteristics of coal seams and macerals. Quarterly technical progress report, May-July 1982, 8:53399 (R;US)
KAON DETECTION
Cherenkov Counters
Cedar counters for particle identification in the SPS secondary beams: A description and an operation manual, 8:54672 (R;XC)
KEK INTERS. STORAGE ACCELERATOR
See TRISTAN STORAGE RINGS
KEK SYNCHROTRON
Japan National Lab for High Energy Physics Synchrotron.
Beam Extraction
Study on low energy intense kaon beam, 8:54616 (R;JP)
Beam Optics
BSF beam line, 8:54588 (R;JP)
Kaon Beams
Study on low energy intense kaon beam, 8:54616 (R;JP)
Polarized Beams
Note on depolarizing resonances in the KEK 12 GeV synchrotron, 8:54590 (R;JP)
KENTUCKY
Oil Sand Deposits
Tar-sand resources of western Kentucky, 8:53450 (RA;US)
Oil Sand Industry
In situ production of heavy oil from Kentucky tar sands, 8:53457 (RA;US)
KERNKRAFTWERK LINGEN
See LINGEN REACTOR
KERNKRAFTWERK NIEDERAICHBACH
See NIEDERAICHBACH REACTOR
KEROSENE
Gas Chromatography
Development of an improved method for the analysis of pressure-core samples. Final report, 8:53432 (R;US)
Mass Spectroscopy
Development of an improved method for the analysis of pressure-core samples. Final report, 8:53432 (R;US)
KETONES
See also ACETONE
Gas Chromatography
Kinds and quantities of organic combustion products in solid and liquid wastes from a coal-fired power station, 8:53393 (R;US)
Hydrogenation
Ionic hydrogen bond. 2. Intramolecular and partial bonds. Protonation of polyethers, crown ethers, and diketones, 8:54321 (J;US)
Mass Spectroscopy
Kinds and quantities of organic combustion products in solid and liquid wastes from a coal-fired power station, 8:53393 (R;US)
Structural Chemical Analysis
Ionic hydrogen bond. 2. Intramolecular and partial bonds. Protonation of polyethers, crown ethers, and diketones, 8:54321 (J;US)
KINETICS EQUATIONS (REACTOR)
See REACTOR KINETICS EQUATIONS
KKN REACTOR
See NIEDERAICHBACH REACTOR
KNOCK-ON ELECTRONS
See ELECTRONS
KOREA (SOUTH)
See REPUBLIC OF KOREA

KRB II-B REACTOR
See GUNDREMMINGEN-2 REACTOR
KRYPTON 85
Retention
Toxicology of ^{85}Kr: tissue distribution and retention in the rat, 8:55064 (J;GB)
Tissue Distribution
Toxicology of ^{85}Kr: tissue distribution and retention in the rat, 8:55064 (J;GB)
KUHFR REACTOR
Reactor Cores
Analysis of the KUCA MEU experiments using the ANL code system, 8:53964 (R;US)
Neutronics and thermal-hydraulics analysis of KUHFR, 8:53961 (R;US)
Reactor Kinetics
Analysis of the KUCA MEU experiments using the ANL code system, 8:53964 (R;US)
Neutronics and thermal-hydraulics analysis of KUHFR, 8:53961 (R;US)
KUR REACTOR
Reactor Noise
Theoretical and experimental notes on noise phenomena of KUR, 8:53966 (RA;JP;In Japanese)
KWL REACTOR
See LINGEN REACTOR
KYOTO UNIVERSITY HIGH FLUX REACTOR
See KUHFR REACTOR
KYOTO UNIVERSITY REACTOR
See KUR REACTOR

L

LA CROSSE BOILING WATER REACTOR
See LACBWR REACTOR
LACBWR REACTOR
Reactor Safety
Integrated plant safety assessment. Systematic Evaluation Program. La Crosse Boiling Water Reactor. Dairyland Power Cooperative, Docket No. 50-409. Final report, 8:54026 (R;US)
LAKES
Bathymetry
Bathymetry of Alaskan arctic lakes: a key to resource inventory with remote-sensing methods, 8:54933 (R;US)
LAMPF II SYNCHROTRON
Antiproton Beams
Nucleon-nucleon interactions and polarized-beam (both proton & antiproton) facilities at LAMPF II, 8:55135 (R;US)
Proton Beams
Nucleon-nucleon interactions and polarized-beam (both proton & antiproton) facilities at LAMPF II, 8:55135 (R;US)
LAND FILLS
See SANITARY LANDFILLS
LAND RECLAMATION
Cost
Reduction of land recontouring costs. Volume I. Texas lignite field. Open file report Sep 78-Jan 81, 8:53395 (R;US)
Reduction of land recontouring costs. Volume II. bituminous coal field, northeast Arizona. Open file report Feb 79-Jun 82, 8:53396 (R;US)
Monitoring
Surface mining environmental monitoring and reclamation handbook (Book), 8:53400 (R;US)
Revegetation
Surface mining environmental monitoring and reclamation handbook (Book), 8:53400 (R;US)
LAND USE
Shrubs
Woody plants and land use, 8:54984 (RA;XA)
Trees
Woody plants and land use, 8:54984 (RA;XA)
LANDFILLS
See SANITARY LANDFILLS
LANGMUIR OSCILLATIONS
See PLASMA WAVES
LANGUAGES (PROGRAMMING)
See PROGRAMMING LANGUAGES
LANTHANUM
Catalytic Effects
Metal hydride catalysis: water formation on exposure of $LaCo_5H$/sub z/ to O_2, 8:54312 (J;US)
Thermal Conductivity
Analysis of thermal conductivity data for fourteen elements in normal and superconducting states. State-of-the-art report, 8:54206 (R;US)
Transition Temperature
Analysis of thermal conductivity data for fourteen elements in normal and superconducting states. State-of-the-art report, 8:54206 (R;US)
LANTHANUM 139 TARGET
Neutron Reactions
Parity nonconservation in neutron resonances (0.88 eV ^{81}Br, 4.53 eV ^{111}Cd, 1.33 eV ^{117}Sn, 0.75 eV ^{139}La neutron resonances), 8:55180 (R;SU;In Russian)
LANTHANUM COMPLEXES
Structural Chemical Analysis
Nuclear magnetic resonance study of ethylenediaminetetrakis(methylenephosphonic acid) and some metal complexes, 8:54332 (J;US)
LANTHANUM COMPOUNDS
See also LANTHANUM HYDRIDES
Crystal-Phase Transformations
Electronically induced phase transformations. Annual report 1 Oct 81-30 Sep 82, 8:54270 (R;US)
LANTHANUM HYDRIDES
Oxidation
Metal hydride catalysis: water formation on exposure of $LaCo_5H$/sub z/ to O_2, 8:54312 (J;US)
LASER BEAM MACHINING
Nozzles
Laser cutting nozzle, 8:54515 (P;US)
LASER CAVITIES
Photolysis
Optical distortion due to gas- dynamic motion in a photolytically pumped cylindrical laser cavity, 8:54514 (J;US)
LASER FUSION REACTORS
Design
Secret high-temperature reactor concept for inertial fusion, 8:55308 (R;US)
LASER MATERIALS
Alkali-rare gas and metal-halide molecules as potential tunable and efficient lasers in the visible. Final report, 1 October 1981-30 September 1982, 8:54499 (R;US)
LASER RADIATION
Antireflection Coatings
Damage threshold measurements at 1.06 μm at Centre d'Etudes de Limeil, 8:55259 (R;FR)
LASER SPECTROSCOPY
Mass Spectroscopy
Method for quantitative determination and separation of trace amounts of chemical elements in the presence of large quantities of other elements having the same atomic mass, 8:54304 (P;US)
LASER TARGETS
Acceleration
Acceleration experiments at low power density, 8:55293 (R;IT)
Creation of ultra-high-pressure shocks by the collision of laser-accelerated disks: experiment and theory, 8:55315 (R;US)
Experimental methods for studying the Rayleigh-Taylor instability of ablatively accelerated targets. Memorandum report, 8:55257 (R;US)
Prospects for optical probing of the Rayleigh-Taylor instability in ablatively-accelerated foil targets. Progress report, 8:55256 (R;US)
Fabrication
Method of forming graded polymeric coatings or films, 8:53724 (P;US)

Laser Implosions
Laser-plasma interaction experiments and diagnostics at NRL (Naval Research Laboratory). Memorandum report, 8:55254 (R;US)

LASER-PRODUCED PLASMA
Backscattering
Stimulated Brillouin backscatter in long scale length plasmas. Memorandum report, 8:55258 (R;US)
Plasma Diagnostics
Laser-plasma interaction experiments and diagnostics at NRL (Naval Research Laboratory). Memorandum report, 8:55254 (R;US)
Rayleigh-Taylor Instability
Experimental methods for studying the Rayleigh-Taylor instability of ablatively accelerated targets. Memorandum report, 8:55257 (R;US)
Prospects for optical probing of the Rayleigh-Taylor instability in ablatively-accelerated foil targets. Progress report, 8:55256 (R;US)

LASERS
Light Amplification by Stimulated Emission of Radiation.
See also CHEMICAL LASERS
FREE ELECTRON LASERS
GAS LASERS
SEMICONDUCTOR LASERS
SOLID STATE LASERS
Bibliographies
Bibliography of Soviet laser developments number 57, January-February 1982, 8:54493 (R;US)
Bibliography of soviet laser developments, number 58, March-April 1982, 8:54503 (R;US)
Performance
Characterization of laser beam quality. Master's thesis, 8:54495 (R;US)
Research Programs
Bibliography of Soviet laser developments number 57, January-February 1982, 8:54493 (R;US)
Research studies on radiative collisional processes. Final report, 1 October 1979-30 September 1982, 8:54498 (R;US)
Saturation
Application of laser resonance saturation to the development of efficient short wavelength lasers. Annual report for period ending 30 Sep 82, 8:54491 (R;US)

LASL
Hot Labs
Decommissioning of a tritium contaminated laboratory, 8:53616 (RA;US)

LATHES
Construction
Design and construction of a large, vertical-axis diamond turning machine, 8:54478 (R;US)
Design
Design and construction of a large, vertical-axis diamond turning machine, 8:54478 (R;US)
Diamonds
Design and construction of a large, vertical-axis diamond turning machine, 8:54478 (R;US)

LATTICE FIELD THEORY
Chiral Symmetry
Studies of chiral symmetry breaking in lattice gauge theory, 8:55155 (R;US)
Monte Carlo Method
Progress in lattice gauge theory, 8:55157 (R;US)
Phase Transformations
Phase transitions in the euclidean and hamiltonian approaches in the lattice gauge theories at finite temperature, 8:55158 (R;SU)
Reviews
Progress in lattice gauge theory, 8:55157 (R;US)

LATTICES (REACTOR)
See REACTOR LATTICES

LEACHATES
Chemical Analysis
Application of a coal-pile drainage model to an industrial/institutional site, 8:53418 (R;US)
Coal combustion waste leachate scaling. Final report, July 1981-June 1982, 8:53388 (R;US)
Chemical Composition
Predictive geochemical modeling of interactions between uranium-mill-tailings solutions and sediments in a flow-through system: model formulations and preliminary results, 8:54926 (R;US)

LEAD
Absorption Spectroscopy
Development of preconcentration techniques for the determination of cadmium, copper, lead and zinc in sea water in conjunction with flame atomic absorption spectrophotometry, 8:54298 (R;TH)
Activation Analysis
Elemental composition of human and animal milk. A review. A report prepared under the auspices of the IAEA in collaboration with the WHO, 8:54983 (R;XA)
Argon 40 Reactions
Search for flow in the reaction Ar + Pb (0.8 GeV/u), 8:55194 (R;US)
Corrosion
Durability of marker materials for nuclear waste isolation sites, 8:53670 (R;US)
Ecological Concentration
Incidence of heavy metals in street surface sediments: solubility and grain size studies, 8:54917 (J;NL)
National Performance Audit Program. Ambient air audits of analytical proficiency, 1981, 8:54904 (R;US)
Proton Reactions
Deuteron production in proton-nucleus interactions at 7.5 GeV/c, 8:55183 (R;SU;In Russian)
Service Life
Durability of marker materials for nuclear waste isolation sites, 8:53670 (R;US)
Spectrophotometry
Development of preconcentration techniques for the determination of cadmium, copper, lead and zinc in sea water in conjunction with flame atomic absorption spectrophotometry, 8:54298 (R;TH)
Weathering
Durability of marker materials for nuclear waste isolation sites, 8:53670 (R;US)

LEAD 208 TARGET
Alpha Reactions
One - and non-coplanar two - particle inclusive cross-sections from the ^{4}He + Pb reaction at 150 MeV/nucleon, 8:55193 (RA;FR)

LEAD 210
L Conversion
Use of solid state detectors for spectrometry of conversion electrons emitted in the decay of lead-210, 8:54667 (RA;AU)
M Conversion
Use of solid state detectors for spectrometry of conversion electrons emitted in the decay of lead-210, 8:54667 (RA;AU)
Radioecological Concentration
Investigation of the speciation of radionuclides in sediments and soils, 8:54920 (RA;AU)
Radiological impact of the operation of coal-fired power stations within Australia, 8:53365 (RA;AU)

LEAD-ACID BATTERIES
Comparative Evaluations
Comparative response of lead-acid and nickel/iron batteries to pulsed and constant-current loads, 8:54046 (R;US)
Performance Testing
Analysis of lead-acid battery accelerated testing data. Final report, 8:54050 (R;US)
Comparative response of lead-acid and nickel/iron batteries to pulsed and constant-current loads, 8:54046 (R;US)
Service Life
Analysis of lead-acid battery accelerated testing data. Final report, 8:54050 (R;US)
Technology Assessment
Application features and considerations in advanced lead-acid and nickel/iron EV batteries, 8:54047 (R;US)

LEAK DETECTORS
Acoustic Monitoring
Acoustic system for pipe rupture monitoring and leak detection, 8:53938 (R;XA)

LEAKAGE (NEUTRON)
See NEUTRON LEAKAGE
LEASES
Environmental Impact Statements
Diapir Field lease offering, June 1984, 8:53440 (R;US)
LED
See LIGHT EMITTING DIODES
LEGAL ASPECTS
Indexes
Title list of documents made publicly available, June 1-30, 1983. Volume 5 No. 6, 8:53907 (R;US)
LEGUMINOSAE
See also GLYCINE HISPIDA
Nitrogen Fixation
Nitrogen fixation by tree crops, 8:54990 (RA;XA)
Nitrogen fixation by cover crops, 8:54991 (RA;XA)
LEPTON NUMBER
Lepton nonconservation and double beta decay, 8:55125 (RA;US)
LEUCOCYTES
See LEUKOCYTES
LEUKEMIA
Radioinduction
Molecular cloning and analysis of the endogenous retrovirus chemically induced from RFM/Un mouse cell cultures, 8:55051 (J;US)
LEUKEMIA VIRUSES
Cloning
Molecular cloning and analysis of the endogenous retrovirus chemically induced from RFM/Un mouse cell cultures, 8:55051 (J;US)
Genetic Mapping
Molecular cloning and analysis of the endogenous retrovirus chemically induced from RFM/Un mouse cell cultures, 8:55051 (J;US)
LEUKOCYTES
See also LYMPHOCYTES
Sensitivity
Microwaves, hyperthermia, and human leukocyte function. Final report, August 1979-June 1982, 8:55072 (R;US)
LEVEL INDICATORS
Design
Ash level meter for a fixed-bed coal gasifier, 8:53362 (P;US)
LIGHT EMITTING DIODES
Physical Radiation Effects
Total-dose radiation-effects data for semiconductor devices. Vol. 1, 8:54759 (R;US)
LIGHT WATER MODERATED REACTORS
See WATER MODERATED REACTORS
LIGHTING SYSTEMS
Energy Conservation
Energy-conservation programs: Kauai County, 8:54177 (RA;US)
LIGNIN
Mass Spectroscopy
Direct mass-spectrometric studies of the pyrolysis of carbonaceous fuels. II. Qualitative observations of primary and secondary processes in biomass, 8:53783 (J;NL)
Pyrolysis
Direct mass-spectrometric studies of the pyrolysis of carbonaceous fuels. II. Qualitative observations of primary and secondary processes in biomass, 8:53783 (J;NL)
LIME-LIMESTONE WET SCRUBBING PROCESSES
Additives
Full-scale utility FGD (flue gas desulfurization) system adipic acid demonstration program. Volume 1. Process results. Final report Jun 80-Nov 82, 8:53391 (R;US)
Full-scale utility FGD (flue gas desulfurization) system adipic acid demonstration program. Volume 2. Continuous emissions monitoring results. Final report Jun 80-Nov 82, 8:53392 (R;US)
LIMITERS
Design
Articulated limiter blade for a tokamak fusion reactor (Patent), 8:55321 (P;US)
Ion Implantation
Retention and thermal release of deuterium implanted in beryllium, 8:55303 (R;US)
Plasma Drift
Task II: ECRH and transport modeling in tandem mirrors and divertor physics. Annual progress report on fusion plasma theory, January 1, 1983-December 31, 1983, 8:55241 (R;US)
Radioactivation
Disposal of activated fusion wall materials, 8:53727 (R;US)
LINACS
See LINEAR ACCELERATORS
LINEAR ACCELERATORS
See also HILACS
QUADRUPOLE LINACS
STANFORD 20-GEV LINAC
Beam Dynamics
Coherent instabilities of a relativistic bunched beam, 8:54593 (R;US)
Beam Monitors
Noise reduction in the beam current monitor, 8:54610 (R;JP)
Computer Calculations
Program LINEL of calculation of resonant structures for linear accelerators, 8:54580 (R;PL;In Russian)
Electric Fields
Measurement of the threshold and nominal values of HF fields in the cavities of the linac with HF focusing, 8:54578 (R;SU;In Russian)
Three-dimensional electrostatic field computation for an accelerating structure with spatial-uniform focusing, 8:54577 (R;SU;In Russian)
Electromagnetic Fields
Transverse quadrupole wake field effects in high intensity linacs, 8:54627 (J;GB)
Installation
Linear accelerator facility, 8:54595 (RA;AU)
Kilo Amp Beam Currents
Outline of heavy ion beam accelerator for inertial confinement fusion, 8:54639 (RA;JP)
Performance
Transverse quadrupole wake field effects in high intensity linacs, 8:54627 (J;GB)
Positron Sources
Production of slow positrons beams with an electron linac, 8:54630 (BA;NL)
Pulse Shapers
Project of aluminium ducts for pulsed beam stretcher, 8:54614 (RA;JP;In Japanese)
RF Systems
Estimations of cavity loading by beam for the linac injector for booster and initial consideration for construction of the power input and RF field stabilization systems, 8:54562 (R;SU;In Russian)
Study on transition processes in the stabilization system with HF feedback coupler, 8:54563 (R;SU;In Russian)
LINGEN REACTOR
Reactor Decommissioning
Plans and activities for decommissioning of LWR power plants by the German utilities, 8:54003 (RA;US)
LIQUID ASPHALT
See PETROLEUM RESIDUES
LIQUID COLUMN CHROMATOGRAPHY
Polarimeters
Ultrasensitive optical rotation and refractive-index measurements, 8:54294 (R;US)
LIQUID EFFLUENTS
See LIQUID WASTES
LIQUID FUELS
See also GASOLINE
KEROSENE
Decomposition
Liquid phase decomposition: a possible problem with fuels in high pressure systems, 8:54362 (RA;US)
Economics
Assessment of ether and alcohol fuels from coal. Volume I. Summary. Final report (Mixtures of ethers and higher alcohols with gasoline), 8:53742 (R;US)
Evaporation
Liquid phase decomposition: a possible problem with fuels in high pressure systems, 8:54362 (RA;US)

Feasibility Studies
Assessment of ether and alcohol fuels from coal. Volume I. Summary. Final report (Mixtures of ethers and higher alcohols with gasoline), 8:53742 (R;US)
Performance Testing
Assessment of ether and alcohol fuels from coal. Volume I. Summary. Final report (Mixtures of ethers and higher alcohols with gasoline), 8:53742 (R;US)
LIQUID METAL TEST FACILITIES
See TEST FACILITIES
LIQUID SCINTILLATION DETECTORS
Other physics experiments at the Homestake Mine, 8:54653 (RA;US)
Efficiency
Increasing uniformity of light collection in extended scintillation counters by means of spectral shift of scintillator emission, 8:54681 (R;SU;In Russian)
Performance
Homestake tracking spectrometer: a one-mile deep 1400-ton liquid scintillation nucleon decay detector, 8:54647 (RA;US)
LIQUID WASTES
See also WASTE WATER
Chemical Analysis
Kinds and quantities of organic combustion products in solid and liquid wastes from a coal-fired power station, 8:53393 (R;US)
LIQUID-PHASE SINTERING
See SINTERING
LIQUIDS
See also COAL LIQUIDS
Electron Attachment
Electron-molecule interactions in gases and liquids: the electron-attachment process in gases and nonpolar liquids, 8:55110 (R;US)
Emission Spectroscopy
Direct liquid sample introduction into an inductively coupled argon plasma, 8:54293 (R;US)
Photoemission yields of liquids in the vacuum ultraviolet, 8:55114 (R;US)
Forced Convection
Convective heat transfer with a periodic longitudinal heat flux variation, 8:54521 (RA;US)
Impurities
Backflow in two and three dimensions, 8:55121 (R;XA)
Photoemission
Photoemission yields of liquids in the vacuum ultraviolet, 8:55114 (R;US)
LITHIUM
Auger Effect
On the theory of the KVV Auger spectrum of Li, 8:55120 (J;US)
Equations of State
Lithium equation-of-state, 8:54240 (R;US)
LITHIUM 6 REACTIONS
Fusion Reactions
Fusion of heavy ions in an interaction potential model, 8:55168 (R;PL;In Polish)
LITHIUM 7 TARGET
Pion Plus Reactions
Detection of inverse electroproduction of pions on ^{7}Li nuclei, 8:55172 (R;SU;In Russian)
LITHIUM COMPLEXES
Chemical Reactions
Bimetallic anionic formyl complexes: synthesis and properties, 8:54331 (J;US)
LITHIUM OXIDES
Compatibility
Neutron irradiation and compatibility testing of Li_2O, 8:55283 (R;US)
Neutron Reactions
Neutron irradiation and compatibility testing of Li_2O, 8:55283 (R;US)
Stress Corrosion
Neutron irradiation and compatibility testing of Li_2O, 8:55283 (R;US)
LMFBR TYPE REACTORS
See also BN-350 REACTOR
BOR-60 REACTOR
SUPER PHENIX REACTOR
Coolants
Current status on the development of sodium boiling detection system in Japan, 8:53946 (R;JP)
Transmission experiment by the simulated LMFBR model and propagation analysis of acoustic signals, 8:53947 (R;JP)
Failed Element Detection
Current status of Japanese research and development activity and program plan on failed fuel detection and location systems for LMFBR, 8:53900 (R;JP)
Gas tagging system development in Japan, 8:53902 (R;JP)
Failed Element Monitors
Summary of in-pile loop experiments related to the development of the fuel failure detection systems for LMFBR in Japan, 8:53901 (R;JP)
Fuel Cycle
Studies on the properties of hard-spectrum, actinide fissioning reactors. Final report, 8:53913 (R;US)
Study of the behavior of actinides continuously recycled in a hard spectrum reactor, 8:53912 (R;US)
Fuel Pins
Sealing coupling, 8:53905 (P;US)
Fuel-Cladding Interactions
Technique for examining the fuel/cladding interface by TEM, 8:53897 (R;US)
Loss of Flow
Physics of reactor safety. Quarterly report, April-June 1983. Volume II, 8:54033 (R;US)
Meltdown
Fabrication of UO_2-stainless steel fuel for a fast-reactor safety test, 8:54020 (R;US)
Reactor Core Disruption
NaOH-rich corner of the (Na^+, Ca^{2+}) (OH^-, CO_3^{2-}) reciprocal system, 8:54031 (R;US)
Physics of reactor safety. Quarterly report, April-June 1983. Volume II, 8:54033 (R;US)
Reactor Cores
Studies on the properties of hard-spectrum, actinide fissioning reactors. Final report, 8:53913 (R;US)
Study of the behavior of actinides continuously recycled in a hard spectrum reactor, 8:53912 (R;US)
Reactor Kinetics
Studies on the properties of hard-spectrum, actinide fissioning reactors. Final report, 8:53913 (R;US)
Study of the behavior of actinides continuously recycled in a hard spectrum reactor, 8:53912 (R;US)
Reactor Safety
Advanced reactor safety research. Quarterly report, October-December 1981. Volume 20, 8:54027 (R;US)
Scram Rods
Magnetic switch for reactor control rod, 8:53950 (P;US)
LOCA
See LOSS OF COOLANT
LOCAL BOILING
See SUBCOOLED BOILING
LOCAL GOVERNMENT
Directories
Energy emergency handbook, 8:54055 (R;US)
Emergency Plans
Emergency response guidelines for state and local governments for radioactive material transportation accidents, 8:53706 (RA;US)
LOCKS (SECURITY)
See PHYSICAL PROTECTION DEVICES
LOGIC CIRCUITS
On-Line Measurement Systems
Event selection in the experiments on studying μ-atomic and mesic molecular processes, 8:54696 (R;SU;In Russian)
LOS ALAMOS SCIENTIFIC LABORATORY
See LASL
LOS ANGELES
Air Pollution
Los Angeles field modeling and measurement study - 1976 (first year). Final report, 8:54883 (R;US)
Los Angeles field modeling and measurement study - 1978 (second year). Final report, 8:54884 (R;US)

LOSS OF COOLANT
Controlled Atmospheres
Application of the TEMPEST computer code for simulating hydrogen distribution in model containment structures (PWR; BWR), 8:54035 (R;US)
Heat Transfer
Experimental and analytical investigation of uncovered core heat transfer under high pressure, low heat flux conditions, 8:54041 (J;NL)
Investigtion of the system behaviour of a pressurised-water reactor in loss-of-coolant accidents: the PKL experiment, 8:54040 (TJ;GB)
Hydraulics
Investigtion of the system behaviour of a pressurised-water reactor in loss-of-coolant accidents: the PKL experiment, 8:54040 (TJ;GB)
Hydrodynamics
Studies on fluid impurities due to accidents in the containment of PWR reactors, 8:54023 (R;DE;In German)
LOSS OF FLOW
After-Heat
Thermohydraulics in a high-temperature gas-cooled reactor primary loop during early phases of unrestricted core-heatup accidents, 8:53985 (R;US)
Heat Transfer
Physics of reactor safety. Quarterly report, April-June 1983. Volume II (LMFBR), 8:54033 (R;US)
Thermohydraulics in a high-temperature gas-cooled reactor primary loop during early phases of unrestricted core-heatup accidents, 8:53985 (R;US)
Hydraulics
Physics of reactor safety. Quarterly report, April-June 1983. Volume II (LMFBR), 8:54033 (R;US)
Thermohydraulics in a high-temperature gas-cooled reactor primary loop during early phases of unrestricted core-heatup accidents, 8:53985 (R;US)
Pressure Gradients
Thermohydraulics in a high-temperature gas-cooled reactor primary loop during early phases of unrestricted core-heatup accidents, 8:53985 (R;US)
Temperature Gradients
Thermohydraulics in a high-temperature gas-cooled reactor primary loop during early phases of unrestricted core-heatup accidents, 8:53985 (R;US)
LOUISIANA
Hydrology
Potentiometric-level monitoring program - Mississippi and Louisiana: annual status report for Fiscal Year 1982 (Richton and Vacherie domes), 8:53671 (R;US)
Salt Deposits
Analysis of tiltmeter monitoring of Northern Louisiana salt domes, 8:53666 (RA;US)
Palynological studies Vacherie and Rayburn's domes North Louisiana salt dome basin, 8:53665 (RA;US)
Precise leveling, Vacherie salt dome, Webster and Bienville Parishes, Louisiana, 8:53667 (RA;US)
Surface hydrology study, 8:53669 (RA;US)
Topical reports on Louisiana salt domes, 8:53664 (R;US)
Water Springs
Saline spring study, 8:53668 (RA;US)
LOW DOSE IRRADIATION
Biological Radiation Effects
Historical background and overview of epidemiological studies on the effects of low-level radiation, 8:55014 (RA;US)
Theoretical epidemiology applied to health physics: estimation of the risk of radiation-induced breast cancer, 8:55013 (RA;US)
Dose-Response Relationships
Estimating the carcinogenetic effects on humans of low doses of radiation or chemicals, 8:55066 (J;US)
Risk Assessment
Critical review of the Hanford worker studies: cancer risk and low-level radiation, 8:55037 (RA;US)
LOW-LEVEL RADIOACTIVE WASTES
Exceptions
Exemption of low-level decommissioning waste from controlled handling and disposal, 8:53626 (RA;US)
Radioactive Waste Disposal
Evaluation of a small, inexpensive incinerator for institutional radioactive waste, 8:53685 (J;GB)
Underground Disposal
Numerical analysis of burial ground geography, 8:53684 (J;GB)
Waste Transportation
Low-level waste transportation: legislative issues in the northeast United States, 8:53536 (RA;US)
LUCENS REACTOR
Reactor Decommissioning
Decommissioning of Lucens, 8:53994 (RA;US)
Reactor Dismantling
Decommissioning of Lucens, 8:53994 (RA;US)
LUMBER INDUSTRY
See WOOD PRODUCTS INDUSTRY
LUMINESCENT CHAMBERS
Uses
Scintillation chamber of calorimeters for colliding beam detectors, 8:54715 (RA;US)
LUNGS
Autoradiography
Fragmentation of inhaled $^{238}PuO_2$ particles in lung, 8:55054 (J;GB)
Neoplasms
Mortality followup through 1977 of the white underground uranium miners cohort examined by the US Public Health Service, 8:53692 (RA;US)
Radiation Doses
Radiation dosimetry for epidemiology lung cancer study, 8:55032 (RA;US)
Radionuclide Kinetics
Assessment of plutonium internal contamination in man, 8:55041 (R;XE)
LURGI PROCESS
Great Plains Gasification Associates. Quarterly technical and environmental report, Great Plains coal gasification project, Mercer County, North Dakota, second quarter, 1983, 8:53336 (R;US)
LWBR TYPE REACTORS
Fuel Elements
Axially staggered seed-blanket reactor-fuel-module construction, 8:53904 (P;US)
Reactor Cores
Axially staggered seed-blanket reactor-fuel-module construction, 8:53904 (P;US)
LYMPHOCYTES
Electrophoresis
Computerized system for matching and stretching two-dimensional gel patterns represented by parameter lists, 8:54338 (BA;DE)
LYMPHOID CELLS
See LYMPHOCYTES

M

MA 754
See NICKEL BASE ALLOYS
MA 956
See IRON BASE ALLOYS
MACERALS
Chemical Properties
Computerized pyrolysis mass spectrometry of coal maceral concentrates, 8:53359 (J;US)
Some variations of properties of coal macerals elucidated by density gradient separation, 8:53374 (J;US)
Electron Spin Resonance
Electron spin resonance of isolated coal macerals: a preliminary survey, 8:53376 (J;US)
Fluorescence
Effect of thermal alteration on petrographic constituents of the Hanna No. I coal, 8:53380 (J;US)
Premaceral contents of peats correlated with proximate and ultimate analysis, 8:53377 (J;US)

Mass Spectroscopy
Computerized pyrolysis mass spectrometry of coal maceral concentrates, 8:53359 (J;US)
Petrography
Application of 2-D and dipolar dephasing ^{13}C NMR techniques to the study of structural variations in coal macerals, 8:53375 (J;US)
Premaceral contents of peats correlated with proximate and ultimate analysis, 8:53377 (J;US)
Reactivity and characterization of coal macerals, 8:53378 (J;US)
Pyrolysis
Computerized pyrolysis mass spectrometry of coal maceral concentrates, 8:53359 (J;US)
Structural Chemical Analysis
Application of 2-D and dipolar dephasing ^{13}C NMR techniques to the study of structural variations in coal macerals, 8:53375 (J;US)
Swelling
Data base for the analysis of compositional characteristics of coal seams and macerals. Quarterly technical progress report, May-July 1982, 8:53399 (R;US)

MAGNESIUM
Activation Analysis
Elemental composition of human and animal milk. A review. A report prepared under the auspices of the IAEA in collaboration with the WHO, 8:54983 (R;XA)
Thermal Diffusion
Thermodiffusional transport in pelagic clay: implications for nuclear waste disposal in geological media, 8:53683 (J;US)

MAGNESIUM 24
Binding Energy
Binding energy calculations using the molecular orbital wave function, 8:55167 (R;XA)

MAGNESIUM COMPOUNDS
See also MAGNESIUM OXIDES
Crystal Defects
Deep level defects in semiconductors. Final technical report 1 Jul 78-30 Jun 80, 8:54271 (R;US)
Physical Radiation Effects
Radiation damage in ceramics: the influence of grain boundaries ($MgAl_2O_4$; YAG), 8:54258 (RA;US)

MAGNESIUM OXIDES
Physical Radiation Effects
Study of radiation damage in MgO using HVEM, 8:54259 (RA;US)

MAGNET COILS
Design
Advanced high-field coil designs: 20 TESLA, 8:55310 (R;US)
Minimum-thickness low-activation toroidal field coil concept for tokamak reactors, 8:55290 (R;US)
Physics considerations for tandem-mirror magnet design, 8:55314 (R;US)
Stress Analysis
PAFMOV: a PAFEC to MOVIE.BYU conversion, 8:55284 (R;US)
Using PAFEC as a preprocessor for COSMIC/NASTRAN, 8:55286 (R;US)

MAGNETIC COILS
See MAGNET COILS

MAGNETIC FIELD CONFIGURATIONS
For pinch configurations, use the narrower terms of PINCH EFFECT.
Fast reconnection of magnetic fields in a plasma, 8:55287 (R;US)

MAGNETIC FIELDS
See also GEOMAGNETIC FIELD
Biological Effects
Immunological and hematological effects of microwave power transmission from a satellite power system (Part 1 and Part 2). Final report, 8:55073 (R;US)
Computer Calculations
Efficient technique for calculating multiple solutions of electric-field problems. Part II. Corrections and modifications of the WINDOW program. Final report, 8:55222 (R;US)
Computerized Simulation
Efficient technique for calculating multiple solutions of electric-field problems. Part II. Corrections and modifications of the WINDOW program. Final report, 8:55222 (R;US)

MAGNETIC MIRROR CONFIGURATIONS
Microwave Equipment
TARA considerations, 8:55280 (RA;US)
Thermal Barriers
Thermal barriers: their purpose and functioning, 8:55316 (R;US)

MAGNETIC MIRROR TYPE REACTORS
See also MARS REACTOR
TMR REACTORS
Microwave Equipment
ETR transmission systems, 8:55272 (RA;US)

MAGNETIC MIRRORS
Including systems with minimum-B configuration.
See also MFTF DEVICES
Minimum Average-B Configurations
Parameter optimizations of multiple-mirror reactors, 8:55318 (J;AT)

MAGNETIC MONOPOLES
Other physics experiments at the Homestake Mine, 8:54653 (RA;US)
Results from the Soudan 1 detector, 8:55124 (RA;US)
Radiation Detection
Searching for the GUT monopole, 8:54655 (RA;US)

MAGNETIC RESONANCE
See also NUCLEAR MAGNETIC RESONANCE
Reviews
Detection of transient paramagnetic intermediates by time-resolved magnetic resonance and related techniques, 8:54305 (J;GB)

MAGNETIC SPECTROMETERS
Installation for studying pion radiative scattering on nuclei, 8:54683 (R;SU;In Russian)
Integrated Circuits
Organization of the RISK spectrometer electronic logic circuits on the base of the event preliminary selection unit, 8:54697 (R;SU;In Russian)

MAGNETITE
Crystal Structure
Structure of magnetite (Fe_3O_4) below the Verwey transition temperature, 8:54263 (J;DK)

MAGNETOHYDRODYNAMIC CHANNELS
See MHD CHANNELS

MAGNETOSPHERE
Electric Fields
Electric fields in earth orbital space. Annual report, 8:55089 (R;US)
Electrons
Electron acceleration by Landau resonance with whistler mode wave packets. Progress report, 8:55098 (R;US)
Plasma Waves
Electron beam-induced electromagnetic waves in a magnetospheric plasma. Technical report, 8:55099 (R;US)

MAHOGANY TREES
See TREES

MALIGNANCIES
See NEOPLASMS

MAMMARY GLANDS
Dimensions
Representative breast size of reference female and reply, 8:55216 (J;GB)
Reference Man
Representative breast size of reference female and reply, 8:55216 (J;GB)

MAN
All of mankind, of any age or of either sex.
Dose Rates
Transport analyses for determination of man-rem dose rates with regard to different modes of transport, routing and packaging, 8:53698 (RA;US)

Environmental Exposure Pathway
Transport analyses for determination of man-rem dose rates with regard to different modes of transport, routing and packaging, 8:53698 (RA;US)
Positron Computed Tomography
Dynamic positron emission tomography in man using small bismuth germanate crystals, 8:54752 (BA;NL)
MANGANESE
Activation Analysis
Elemental composition of human and animal milk. A review. A report prepared under the auspices of the IAEA in collaboration with the WHO, 8:54983 (R;XA)
Ecological Concentration
Incidence of heavy metals in street surface sediments: solubility and grain size studies, 8:54917 (J;NL)
Toxicity
Health assessment document for manganese. External review draft, 8:55071 (R;US)
MANGANESE COMPLEXES
Chemical Reactions
Bimetallic anionic formyl complexes: synthesis and properties, 8:54331 (J;US)
Structural Chemical Analysis
Argonne intense pulsed neutron source used to solve the molecular structure of a novel organometallic complex, 8:54318 (J;US)
MANGANESE IONS
Ion Spectroscopy
Dielectronic recombination rates, ionization equilibrium, and radiative emission rates for MN ions in low-density high-temperature plasmas. Memorandum report, 8:55103 (R;US)
MANGANESE STEELS
Fatigue
Fatigue crack growth and fracture resistance of steels in high-pressure hydrogen environments. Final report, 8:54211 (R;XE)
Hydrogen Embrittlement
Fatigue crack growth and fracture resistance of steels in high-pressure hydrogen environments. Final report, 8:54211 (R;XE)
Mechanical Properties
Influence of alloy composition on the cryogenic mechanical properties of AISI 200 grade high-manganese austenitic steels, 8:54219 (R;US)
MANOMETERS
See PRESSURE GAGES
MANUFACTURING
Environmental Impacts
Industrial process profiles for environmental use: Chapter 30. The electronic component manufacturing industry. Final report, 8:54960 (R;US)
MANUFACTURING FACILITIES
See INDUSTRIAL PLANTS
MAR-250 ALLOY
See MARAGING STEELS
MARAGING STEELS
Activation Analysis
Ion beam measurements of depth profiles of deuterium concentration in steels. Pt.1: investigation of 18Ni250 high temperature aged martensitic steel, 8:54301 (R;GB)
MARBLE
Service Life
Durability of marker materials for nuclear waste isolation sites, 8:53670 (R;US)
MARICULTURE
See AQUACULTURE
MARINE ECOSYSTEMS
See AQUATIC ECOSYSTEMS
MARS REACTOR
Design
Summary of the MARS tandem-mirror reactor design, 8:55313 (R;US)
MASKS
See RESPIRATORS
MASS SPECTROMETERS
Design
"Lidia" ultrasensitive mass spectrometer, 8:54761 (R;SU)
Mass Resolution
"Lidia" ultrasensitive mass spectrometer, 8:54761 (R;SU)
MASS SPECTROSCOPY
Ionization
Selective laser ionization for mass-spectral isotopic analysis, 8:55116 (R;US)
Photoionization
Method for quantitative determination and separation of trace amounts of chemical elements in the presence of large quantities of other elements having the same atomic mass, 8:54304 (P;US)
Resolution
Selective laser ionization for mass-spectral isotopic analysis, 8:55116 (R;US)
Reviews
High-sensitivity mass spectrometry with a tandem accelerator, 8:54603 (R;US)
Tandem Electrostatic Accelerators
High-sensitivity mass spectrometry with a tandem accelerator, 8:54603 (R;US)
Time-of-Flight Method
Time-of-flight mass spectrometer, 8:54780 (P;US)
MASS TRANSIT SYSTEMS
Planning
Comparative analysis study of alternative transit systems - South Hills Corridor. Final report, 8:54152 (R;US)
MASURIUM
See TECHNETIUM
MATERIALS
See also BIOLOGICAL MATERIALS
BUILDING MATERIALS
CARBONACEOUS MATERIALS
DIELECTRIC MATERIALS
HAZARDOUS MATERIALS
LASER MATERIALS
POROUS MATERIALS
RADIOACTIVE MATERIALS
RAW MATERIALS
REACTOR MATERIALS
SEALING MATERIALS
SEMICONDUCTOR MATERIALS
THERMONUCLEAR REACTOR MATERIALS
TOXIC MATERIALS
Research Programs
Evaluative report on the Institute for Materials Research, National Bureau of Standards - fiscal year 1976. Annual report, 8:54202 (R;US)
Evaluative report on the Institute for Materials Research, National Bureau of Standards - fiscal year 1977. Annual report, 8:54203 (R;US)
MATERIALS (BIOLOGICAL)
See BIOLOGICAL MATERIALS
MATERIALS (BUILDING)
See BUILDING MATERIALS
MATERIALS (DIELECTRIC)
See DIELECTRIC MATERIALS
MATERIALS (FERROMAGNETIC)
See FERROMAGNETIC MATERIALS
MATERIALS HANDLING EQUIPMENT
See also CRANES
REMOTE HANDLING EQUIPMENT
Cargo-restraint-transporter (CRT): a proven method of handling drum-type containers on safe-secure trailers (SSTs), 8:53541 (RA;US)
Seismic Effects
Seismic evaluation of headframe and associated equipment, 8:53661 (R;US)
MATERIALS (POROUS)
See POROUS MATERIALS
MATERIALS RECOVERY
Economics
CO_2-recovery from flue gases, 8:54886 (R;US)
MATERIALS (SEMICONDUCTOR)
See SEMICONDUCTOR MATERIALS
MATERIALS TESTING
Planning
Mathematical model for long-term and current planning of materials research and development with restrictions on the experimental equipment lifetime, 8:54542 (R;SU;In Russian)

MATERIALS TESTING REACTOR JAPAN
See JMTR REACTOR
MATHEMATICAL MODELS
See also FLOW MODELS
Comparative Evaluations
Physical properties of SRC-I slurries under preheater conditions. Final report, 8:53348 (R;US)
MEAT
Radioactivity
Preliminary investigation of radiation level and some radionuclides in imported food and food products, 8:54295 (R;TH)
Radiometric Analysis
Preliminary investigation of radiation level and some radionuclides in imported food and food products, 8:54295 (R;TH)
MEDICAL CENTERS
See also HOSPITALS
Energy Management
Energy management in a health-care institute, 8:54131 (RA;US)
MELAMINE
Compacting
Compaction of porous beds of inert materials, 8:54851 (RA;US)
MELANOCYTES
See ANIMAL CELLS
MELTDOWN
Heat Transfer
Model for superheated debris-bed quench for severe-accident containment calculations (PWR; BWR), 8:53986 (R;US)
Hydraulics
Model for superheated debris-bed quench for severe-accident containment calculations (PWR; BWR), 8:53986 (R;US)
Reactor Safety Experiments
Fabrication of UO_2-stainless steel fuel for a fast-reactor safety test, 8:54020 (R;US)
MELTING
Phase Studies
Some aspects of the computer simulation of conduction heat transfer and phase change processes, 8:54045 (BA;US)
MERCURY
Activation Analysis
Elemental composition of human and animal milk. A review. A report prepared under the auspices of the IAEA in collaboration with the WHO, 8:54983 (R;XA)
Ecological Concentration
Determination of baseline levels of toxic nonradioactive substances at the ICPP, 8:53648 (R;US)
Total airborne mercury and its possible origin, 8:54890 (J;NL)
Isotope Dilution
Development of an analytical technique for the determination of traces of mercury by substoichiometric isotope dilution method, 8:54296 (R;TH)
Pollution Sources
Total airborne mercury and its possible origin, 8:54890 (J;NL)
Solvent Extraction
Development of an analytical technique for the determination of traces of mercury by substoichiometric isotope dilution method, 8:54296 (R;TH)
MESON EXCHANGE
See BOSON-EXCHANGE MODELS
METAL INDUSTRY
Energy Conservation
Innovative industrial-materials processes, 8:54175 (R;US)
Energy Consumption
Energy and materials flows in the iron and steel industry, 8:54159 (R;US)
Information Systems
Materials information systems. Volume VI. Aluminum case study, 8:54237 (R;US)
METAL SPRAYING
See SPRAY COATING
METAL-GAS BATTERIES
Anodes
Parasitic corrosion-resistant anode for use in metal/air or metal/O_2 cells, 8:54052 (P;US)
METALLIC GLASSES
Catalytic Effects
Chemical properties of metallic glasses, 8:54239 (R;US)
Corrosion Resistance
Chemical properties of metallic glasses, 8:54239 (R;US)
Crystallization
Refractory-metal stabilized amorphous stainless steel. Part 1. Formation and stability of amorphous stainless steel with W or Ti, 8:54249 (J;GB)
Recrystallization
Moessbauer spectroscopy study of amorphous $Fe_{87}B_{11}Au_2$ ribbon and its crystallization products, 8:54216 (R;US)
METALS
See also ALKALI METALS
ALUMINIUM
CADMIUM
GERMANIUM
INDIUM
LEAD
MERCURY
TIN
TRANSITION ELEMENTS
ZINC
Atom Transport
Study of mechanism of hydrogen diffusion in separation devices. Progress report for 1980-1983, 8:53730 (R;US)
Deposition
Electroless metal plating of plastics, 8:54244 (P;US)
Diffusion Coatings
Method of forming graded polymeric coatings or films, 8:53724 (P;US)
Ecological Concentration
Accumulation of atmospherically deposited metals in wetland soils of Sudbury, Ontario, 8:54912 (J;NL)
Electronic Structure
New developments and opportunities for NMR in metal-hydrogen systems, 8:55218 (R;US)
METEORITES
Age Estimation
Microprobe analyses of rare-earth-element fractionation in meteoritic minerals, 8:55094 (R;US)
Chemical Composition
Microprobe analyses of rare-earth-element fractionation in meteoritic minerals, 8:55094 (R;US)
METHANE
Breakdown
Isotope dependence of the breakdown strength of gases, 8:55109 (R;US)
Chemical Preparation
Low temperature methane production by the catalyzed reaction of graphite and water vapor, 8:53358 (J;US)
Chemical Reaction Yield
Bimetallic anionic formyl complexes: synthesis and properties, 8:54331 (J;US)
Experimental studies on the control of hydrocarbons emission from a gasifier. Final report, September 1981-February 1983, 8:53337 (R;US)
Control
Annual report of the Secretary of Labor under the Federal Mine Safety and Health Act of 1977, fiscal year 1979. Volume 2. Mining health and safety research and development, 8:53403 (R;US)
METHANOGENIC BACTERIA
Cultivation Techniques
Methanogenesis from acetate, a key intermediate in nature. Third year report, 8:54979 (R;US)
Mutants
Methanogenesis from acetate, a key intermediate in nature. Third year report, 8:54979 (R;US)
METHANOL
Biodegradation
Methanogenesis from acetate, a key intermediate in nature. Third year report, 8:54979 (R;US)
Decomposition
Solid-state, surface, and catalytic properties of oxides. Progress report, October 1, 1982-August 31, 1983, 8:54306 (R;US)

Gas Chromatography
Identification and separation of the organic compounds in coal-gasification condensate waters, 8:53371 (R;US)
Liquid Column Chromatography
Identification and separation of the organic compounds in coal-gasification condensate waters, 8:53371 (R;US)
Mass Spectroscopy
Identification and separation of the organic compounds in coal-gasification condensate waters, 8:53371 (R;US)
Mixtures
Assessment of ether and alcohol fuels from coal. Volume I. Summary. Final report, 8:53742 (R;US)
Research Programs
North Carolina Energy Institute. Annual report, 1982, 8:54070 (R;US)
Synthesis
Assessment of ether and alcohol fuels from coal. Volume I. Summary. Final report, 8:53742 (R;US)
Solid-state, surface, and catalytic properties of oxides. Progress report, October 1, 1982-August 31, 1983, 8:54306 (R;US)

METHANOL PLANTS
Economic Analysis
Technical and economic assessment of liquid-fuel production from biomass. Final research report, 8:53774 (R;US)

METHIONINE
Labelling
Computerized system for matching and stretching two-dimensional gel patterns represented by parameter lists, 8:54338 (BA;DE)

METHYL ALCOHOL
See METHANOL

METHYL IODIDE
Chemical Reactions
Bimetallic anionic formyl complexes: synthesis and properties, 8:54331 (J;US)

METHYL RADICALS
Chemical Reaction Yield
Shock-tube study of propane pyrolysis. Rate of initial dissociation from 1400 to 2300 K, 8:54366 (J;US)

METHYL-FUEL
See ALCOHOLS
METHANOL

METHYLMERCAPTOAMINOBUTYRIC ACID
See METHIONINE

METHYLTHIOAMINOBUTYRIC ACID
See METHIONINE

METROPOLITAN AREAS
See URBAN AREAS

MFTF DEVICES
Prior to October 1977, MX DEVICES was used to index this concept.
Microwave Equipment
MFTF-B quasi-control ECRH transmission system/waveguide transmission system for TMX-U, 8:55268 (RA;US)
Pressure Vessels
Design and construction of the vacuum vessel for the tandem Mirror Fusion Test Facility, 8:55312 (R;US)

MHD CHANNELS
Electrodes
1000-hour MHD anode test: executive summary, May-August 1981, 8:54114 (R;US)
Flow Models
MHD generator off-design performance and NO/sub x/ chemical-kinetics analysis, 8:54116 (R;US)
Slags
MHD generator off-design performance and NO/sub x/ chemical-kinetics analysis, 8:54116 (R;US)

MHD GENERATOR UTSI
Coal-fired MHD generator at University of Tennessee Space Institute.
Combustors
Numerical investigation of recirculation in the UTSI MHD combustor, 8:54113 (R;US)

MICE
Chronic Irradiation
Neutron and γ-ray effects measured by the micronucleus test, 8:55065 (J;NL)

MICROBIAL PROCESSES
See FERMENTATION

MICROCOMPUTERS
See MICROPROCESSORS

MICROPROCESSORS
Computer-Aided Design
Linked-state machines, 8:55338 (R;US)

MICROSPHERES
Fabrication
Fabrication of glass microspheres with conducting surfaces, 8:53726 (P;US)
Vapor Deposited Coatings
Fabrication of glass microspheres with conducting surfaces, 8:53726 (P;US)

MICROWAVE AMPLIFIERS
100 kW, 140 GHz pulsed gyrotron, 8:54555 (J;US)
ECRH transmission systems for PDX, PLT, TFTR and upgrades, 8:55275 (RA;US)
Transmission lines and launching systems for ECRH on the garching stellarators W VIIa and W VII-AS, 8:55276 (RA;US)
Meetings
ECRH-transmission-system workshop, 8:55263 (R;US)
Performance Testing
ECRH transmission system, 8:55278 (RA;US)
SQUID Devices
Demonstration of SQUID (superconducting quantum interference device) parametric amplifier. Annual report No. 1, 14 September 81-14 September 82, 8:54371 (R;US)

MICROWAVE EQUIPMENT
See also MICROWAVE AMPLIFIERS
SQUID DEVICES
Beam waveguide launcher for electron cyclotron resonance plasma heating, 8:55264 (RA;US)
ECRH transmission system, 8:55277 (RA;US)
ECRH transmission system, 8:55279 (RA;US)
ETR transmission systems, 8:55272 (RA;US)
MFTF-B quasi-control ECRH transmission system/waveguide transmission system for TMX-U, 8:55268 (RA;US)
Microwave transmission systems for the plasma separation process, 8:55267 (RA;US)
TARA considerations, 8:55280 (RA;US)
Performance Testing
CW waterload, etc., 8:55274 (RA;US)
Specifications
Design of the 60 GH/sub z/ system, 8:55273 (RA;US)
SQUID Devices
Applications of Josephson junction SQUIDS (superconducting quantum interference device) and arrays. Annual progress report No. 1, 1 September 81-30 September 82, 8:54370 (R;US)

MICROWAVE RADIATION
Biological Effects
Microwaves, hyperthermia, and human leukocyte function. Final report, August 1979-June 1982, 8:55072 (R;US)
Wave Propagation
Air-breakdown limits for microwave-pulse propagation. Part I. Experiments, 8:54553 (R;US)

MIDWEST REGION
See FEDERAL REGION VII

MIGRATION (RADIONUCLIDE)
See RADIONUCLIDE MIGRATION

MILITARY FACILITIES
Buildings
Analysis of energy conservation alternatives for standard Army building. Final report, 8:54128 (R;US)
Energy Conservation
Analysis of energy conservation alternatives for standard Army building. Final report, 8:54128 (R;US)
Energy Storage
Energy storage criteria handbook. Final report mar 81-jun 82, 8:54125 (R;US)

MILK
Activation Analysis
Elemental composition of human and animal milk. A review. A report prepared under the auspices of the IAEA in collaboration with the WHO, 8:54983 (R;XA)
Chemical Composition
Elemental composition of human and animal milk. A review. A report prepared under the auspices of the IAEA in collaboration with the WHO, 8:54983 (R;XA)
MILK PRODUCTS
Radioactivity
Preliminary investigation of radiation level and some radionuclides in imported food and food products, 8:54295 (R;TH)
Radiometric Analysis
Preliminary investigation of radiation level and some radionuclides in imported food and food products, 8:54295 (R;TH)
MILL TAILINGS
Health Hazards
Cancer incidence study in Mesa County, Colorado, 8:55036 (RA;US)
Canine neoplasia and exposure to uranium mill tailings in Mesa County, Colorado, 8:55034 (RA;US)
Radiation Doses
Canine neoplasia and exposure to uranium mill tailings in Mesa County, Colorado, 8:55034 (RA;US)
Stabilization
Consolidation of tailings, 8:53654 (R;US)
Design considerations for long-term stabilization of uranium mill tailings impoundments, 8:53655 (R;US)
MINE SAFETY AND HEALTH ADMINISTRATION
See US MSHA
MINE-MOUTH GENERATING PLANTS
See COAL MINES
FOSSIL-FUEL POWER PLANTS
MINERAL ACIDS
See INORGANIC ACIDS
MINERAL INDUSTRY
Occupational Safety
Analysis of accidents related to falls of ground in metal and nonmetal mines, 1972-73, 8:55074 (R;US)
Injury experience in metallic mineral mining, 1979, 8:55075 (R;US)
Injury experience in metallic mineral mining, 1981, 8:55078 (R;US)
Injury experience in sand and gravel mining, 1981, 8:55077 (R;US)
MINERALS
See also GARNETS
ZEOLITES
Data Compilation
Use and resources of mineral raw material, statistical data on the raw material supply of Austria, 8:54064 (R;AT;In German)
Geologic Deposits
Use and resources of mineral raw material, statistical data on the raw material supply of Austria, 8:54064 (R;AT;In German)
Leaching
Physico-chemical fracturing and cleaning of coal, 8:53412 (R;US)
Removal
Physico-chemical fracturing and cleaning of coal, 8:53412 (R;US)
Supply and Demand
Concept for supplying Austria with mineral raw- and primary material, 8:54066 (R;AT;In German)
X-Ray Diffraction
Data base for the analysis of compositional characteristics of coal seams and macerals. Quarterly technical progress report, May-July 1982, 8:53399 (R;US)
MINERS
See also COAL MINERS
Injuries
Injury experience in metallic mineral mining, 1979, 8:55075 (R;US)
Injury experience in metallic mineral mining, 1981, 8:55078 (R;US)
Injury experience in sand and gravel mining, 1981, 8:55077 (R;US)
Mortality
Mortality followup through 1977 of the white underground uranium miners cohort examined by the US Public Health Service, 8:53692 (RA;US)
Studies of Grants, New Mexico, uranium miners: status as of December, 1982, 8:55033 (RA;US)
Radiation Doses
Evaluation of the radiation doses to uranium mine employees exposed to external gamma radiation, 8:54999 (R;AU)
MINING
See also COAL MINING
SURFACE MINING
UNDERGROUND MINING
Safety Engineering
Laboratory evaluation of RACAL airstream helmet, 8:55076 (R;US)
MINING EQUIPMENT
Safety Engineering
Testing procedure for the certification of underground protective cabs and canopies, 8:53426 (R;US)
Testing
Testing procedure for the certification of underground protective cabs and canopies, 8:53426 (R;US)
MINING LAWS
See also SURFACE MINING ACTS
Accidents
Annual report and achievements 1977, 8:53409 (R;US)
Compliance
Annual report and achievements 1977, 8:53409 (R;US)
Annual report of the Secretary of Labor under the Federal Mine Safety and Health Act of 1977, fiscal year 1980. Volume 1, 8:53405 (R;US)
Annual report of the Secretary of Labor under the Federal Mine Safety and Health Act of 1977, fiscal year 1979. Volume 1, 8:53402 (R;US)
Enforcement
Annual report and achievements 1977, 8:53409 (R;US)
Annual report of the Secretary of Labor under the Federal Mine Safety and Health Act of 1977, fiscal year 1980. Volume 1, 8:53405 (R;US)
Annual report of the Secretary of Labor under the Federal Mine Safety and Health Act of 1977, fiscal year 1979. Volume 1, 8:53402 (R;US)
Inspection
Annual report of the Secretary of Labor under the Federal Mine Safety and Health Act of 1977, fiscal year 1980. Volume 1, 8:53405 (R;US)
MIRROR ADVANCED REACTOR STUDY
See MARS REACTOR
MIRROR FUSION TEST FACILITY
See MFTF DEVICES
MIRRORS
Mechanical Polishing
Manufacture of mirrors by NC machining of EEM, 8:54473 (RA;JP;In Japanese)
Radiation Heating
Computer simulation of the heating effect on mirrors by synchrotron radiation, 8:54644 (R;JP)
MIRRORS (MAGNETIC)
See MAGNETIC MIRRORS
MISGURNUS
See FISHES
MISSISSIPPI
Hydrology
Potentiometric-level monitoring program - Mississippi and Louisiana: annual status report for Fiscal Year 1982 (Richton and Vacherie domes), 8:53671 (R;US)
Salt Deposits
Petrographic and geochemical characteristics of the Cypress Creek salt core, 8:53663 (R;US)

MIXERS
Design
High-pressure liquid chromatographic gradient mixer, 8:54486 (P;US)
MIXTURES
See also SLURRIES
SOLUTIONS
Phase Studies
Phase equilibria for complex fluid mixtures, 8:53372 (R;US)
MODE LOCKING
Universality and fractal dimension of mode locking structure in systems with competing periodicities, 8:55217 (R;US)
MODELS (FLOW)
See FLOW MODELS
MODELS (MATHEMATICAL)
See MATHEMATICAL MODELS
MODELS (ORGANIZATIONAL)
See ORGANIZATIONAL MODELS
MOLLUSCS
Metabolism
Bioaccumulation kinetics and organ distribution of nickel in the marine clam (Protothaca staminea), 8:54949 (J;US)
MOLTEN CARBONATE FUEL CELLS
Prior to June 1980 this information was indexed with the descriptors HIGH-TEMPERATURE FUEL CELLS + MOLTEN SALTS + CARBONATES.
Hot Gas Cleanup
Development of a hot-gas-cleanup system for integrated coal-gasification/molten-carbonate fuel-cell power plants. Quarterly progress report, April-June 1983, 8:54115 (R;US)
MOLYBDENUM
Activation Analysis
Elemental composition of human and animal milk. A review. A report prepared under the auspices of the IAEA in collaboration with the WHO, 8:54983 (R;XA)
Catalytic Effects
Cooperative investigation by Auburn University and Cities Service Research and Development Company of combined coal and heavy-resid processing. Quarterly report, January 15, 1983-April 15, 1983, 8:53345 (R;US)
MOLYBDENUM 98 TARGET
Neutron Reactions
Search for radiative capture of neutrons in nuclei stimulated by the electric field of a laser wave, 8:55186 (R;SU;In Russian)
MOLYBDENUM ALLOYS
See also ALLOY-A-286
STAINLESS STEEL-316
Physical Radiation Effects
Comparison of the effect of electron and ion irradiation on crystallization of amorphous alloys (62Fe16Cr8Ni14W; 50Mo50Ni), 8:54235 (RA;US)
Order-disorder transition in Ni_4Mo induced by electron irradiation in a high-voltage microscope, 8:54221 (RA;US)
MONITORING
Use of a more specific term is recommended.
See also AEROSOL MONITORING
Cost
Detecting long-term ecological effects in forests and food chains, 8:54911 (R;US)
MONITORING NETWORK
See MONITORING
MONITORS (FAILED ELEMENTS)
See FAILED ELEMENT MONITORS
MONITORS (REACTOR)
See REACTOR CONTROL SYSTEMS
MORGANTOWN ENERGY TECHNOLOGY CENTER
Air Pollution
Environment, safety, and health annual report, fiscal year 1982, 8:53425 (R;US)
Occupational Safety
Environment, safety, and health annual report, fiscal year 1982, 8:53425 (R;US)
Waste Water
Environment, safety, and health annual report, fiscal year 1982, 8:53425 (R;US)
MULTIPARTICLE SPECTROMETERS
High-energy photoproduction of states containing heavy quarks and other rare phenomena, 8:55137 (R;US)
MULTIWIRE DRIFT CHAMBERS
See DRIFT CHAMBERS
MULTIWIRE PROPORTIONAL CHAMBERS
See also DRIFT CHAMBERS
Performance
Performance of a 16000 wire Mini-Drift MWPC system, 8:54713 (RA;US)
MUNICIPAL BUILDINGS
See PUBLIC BUILDINGS
MUNICIPAL WASTES
Briquetting
Gasification of Simplex briquets: briquet production. Vol.1. Final report, 8:53346 (R;US)
Gasification of Simplex briquets: demonstration in the General Electric high-pressure gasifier. Vol.2. Final report, 8:53347 (R;US)
Drying
Gasification of Simplex briquets: briquet production. Vol.1. Final report, 8:53346 (R;US)
Pyrolysis
Evaluation and test program of a 50-ton-per-day Lantz converter. Second quarterly technical progress report, 8:54182 (R;US)
Evaluation and test program of a 50-ton-per-day Lantz converter. Third quarterly technical progress report, 8:54183 (R;US)
MUON DETECTION
Background Radiation
Physics of multiple muons in underground detectors, 8:54654 (RA;US)
Liquid Scintillation Detectors
Other physics experiments at the Homestake Mine, 8:54653 (RA;US)
Shower Counters
Physics of multiple muons in underground detectors, 8:54654 (RA;US)
Results from the Soudan 1 detector, 8:55124 (RA;US)
Test of a flash chamber calorimeter as a nucleon decay detector, 8:54657 (RA;US)
MUON REACTIONS
Gating Circuits
Event selection in the experiments on studying μ-atomic and mesic molecular processes, 8:54696 (R;SU;In Russian)
Logic Circuits
Event selection in the experiments on studying μ-atomic and mesic molecular processes, 8:54696 (R;SU;In Russian)
MUON-NUCLEON INTERACTIONS
Deep Inelastic Scattering
Muon physics and structure function, 8:55129 (RA;XC)
Structure Functions
Muon physics and structure function, 8:55129 (RA;XC)
MUONS
See also COSMIC MUONS
Decay
Search for rare decay modes of the muon, 8:54675 (R;US)
Leptonic Decay
Search for right-handed currents in muon decay, 8:55134 (R;US)
MUSASHI INSTITUTE OF TECHNOLOGY TRIGA REA
See TRIGA-2-MUSASHI REACTOR
MUTATIONS
Radioinduction
Detection of deletion mutations at the gpt locus in pSV2gpt transformed CHO cells, 8:55039 (R;US)
MWPC
See MULTIWIRE PROPORTIONAL CHAMBERS
MX DEVICES
See MFTF DEVICES
MYCOSES
Plant Growth
Water relations of mycorrhiza, 8:54995 (RA;XA)

N

NAI DETECTORS
Calibration
Calibration and use of a lung-monitoring facility using sodium iodide detectors, 8:55215 (R;US)
Design
Search for rare decay modes of the muon, 8:54675 (R;US)
NAL SYNCHROTRON
See FERMILAB ACCELERATOR
NAPHTHALENE
Hydrogenation
Solvent tailoring in coal liquefaction. Quarterly report, August 1982-November 1982, 8:53339 (R;US)
Solvent Properties
Effect of solvent pretreatment on coal liquefaction, 8:53361 (J;US)
NAPHTHOLS
Chemical Reactions
Rate constants for the decay and reactions of the lowest electronically excited singlet state of molecular oxygen in solution, 8:54343 (J;US)
NAPHTHOLS-ALPHA
See NAPHTHOLS
NAPHTHOLS-BETA
See NAPHTHOLS
NATIONAL ACCELERATOR LABORATORY
See FERMILAB ACCELERATOR
NATIONAL BUREAU OF STANDARDS
See US NBS
NATIONAL BUREAU OF STANDARDS REACTOR
See NBSR REACTOR
NATIONAL ENERGY PLAN
The plan proposed by President Carter in April, 1977.
Data Analysis
NEPP-IV: DOE's Fourth Biennial National Energy Policy Plan, 8:54089 (J;US)
NATIONAL GOVERNMENT
Use only when needed in conjunction with one or both of the terms LOCAL GOVERNMENT and STATE GOVERNMENT.
Directories
Energy emergency handbook, 8:54055 (R;US)
Emergency Plans
Energy emergency handbook, 8:54055 (R;US)
NATIONAL SYNCHROTRON LIGHT SOURCE
See NSLS
NATURAL ACTIVITY
See NATURAL RADIOACTIVITY
NATURAL CIRCULATION
See NATURAL CONVECTION
NATURAL CONVECTION
Boundary-Value Problems
Laminar natural convection along vertical corners, 8:54520 (RA;US)
Mathematical Models
Laminar natural convection along vertical corners, 8:54520 (RA;US)
NATURAL GAS
Cost
Commercial energy costs for SOLCOST data bank cities, Winter 1982-1983, 8:54105 (R;US)
Depressurization
Energy recovery from natural-gas pressure-regulator stations, 8:53446 (R;US)
Energy Consumption
Natural gas monthly, 8:53445 (R;US)
Exports
Natural gas monthly, 8:53445 (R;US)
Imports
Natural gas monthly, 8:53445 (R;US)
Marketing
Natural gas monthly, 8:53445 (R;US)
Prices
Natural gas monthly, 8:53445 (R;US)
Production
Natural gas monthly, 8:53445 (R;US)
Underground Storage
Natural gas monthly, 8:53445 (R;US)
NATURAL GAS DEPOSITS
Leases
Diapir Field lease offering, June 1984, 8:53440 (R;US)
NATURAL GAS INDUSTRY
Data Compilation
Natural gas monthly, 8:53445 (R;US)
Energy Recovery
Energy recovery from natural-gas pressure-regulator stations, 8:53446 (R;US)
NATURAL GAS WELLS
Directional Drilling
Wellbore inertial directional surveying system, 8:53436 (P;US)
Economics
Indexes and estimates of domestic well drilling costs, 1982 and 1983, 8:53444 (R;US)
Well Logging
Wellbore inertial directional surveying system, 8:53436 (P;US)
NATURAL LIGHTING
See DAYLIGHTING
NATURAL RADIOACTIVITY
For unspecified naturally occurring radioisotopes only; not for BACKGROUND RADIATION.
Radiation Hazards
Natural radioactivity in bottled mineral water, 8:54950 (RA;AU)
NATURE RESERVES
Feasibility Studies
National Environmental Research Areas: FOCI for integrated research in western energy resource regions. A feasibility study report, 8:53394 (R;US)
NBSR REACTOR
Research Programs
NBS reactor: summary of activities July 1981 through June 1982. Technical note. Jul 81-Jun 82, 8:53968 (R;US)
NEGATONS
See ELECTRONS
NEGATRONS
See ELECTRONS
NEON 20
Binding Energy
Binding energy calculations using the molecular orbital wave function, 8:55167 (R;XA)
NEON 22 REACTIONS
Fusion Reactions
Calculation of fusion cross sections, 8:55175 (R;DD;In German)
NEOPENTANE
See 2-2-DIMETHYLPROPANE
NEOPLASMS
See also CARCINOMAS
LEUKEMIA
SARCOMAS
Diagnostic Techniques
Differential radioactivity monitor for non-invasive detection of ocular melanoma, 8:54977 (P;US)
Epidemiology
Cancer incidence study in Mesa County, Colorado, 8:55036 (RA;US)
Development of cancer risk estimates from epidemiologic studies, 8:55024 (RA;US)
Radioinduction
Canine neoplasia and exposure to uranium mill tailings in Mesa County, Colorado, 8:55034 (RA;US)
Critical review of the Hanford worker studies: cancer risk and low-level radiation, 8:55037 (RA;US)
Development of cancer risk estimates from epidemiologic studies, 8:55024 (RA;US)
Epidemiology applied to health physics, 8:55003 (R;US)
Epidemiological methods: a brief review, 8:55005 (RA;US)
Historical background and overview of epidemiological studies on the effects of low-level radiation, 8:55014 (RA;US)
Lung cancer among workers at a uranium processing plant, 8:55029 (RA;US)
Methodologic assessment of radiation epidemiology studies, 8:55006 (RA;US)

New NRC methodology for estimating biological risks from exposure to ionizing radiation, 8:55019 (RA;US)
Relative and absolute risk in epidemiology and health physics, 8:55023 (RA;US)
Some statistical considerations related to the estimation of cancer risk following exposure to ionizing radiation, 8:55007 (RA;US)
Theoretical epidemiology applied to health physics: estimation of the risk of radiation-induced breast cancer, 8:55013 (RA;US)

Risk Assessment
Development of cancer risk estimates from epidemiologic studies, 8:55024 (RA;US)

NEPTUNIUM COMPLEXES
Structural Chemical Analysis
Raman spectrometric studies of actinide(V) and -(VI) complexes in aqueous sodium carbonate solution and of solid sodium actinide(V) carbonate compounds, 8:54350 (J;US)

NEUTRAL BEAM SOURCES
Reviews
Neutral beam data systems at ORNL, 8:55285 (R;US)

NEUTRINO DETECTION
Proposal for the establishment of a national underground physics laboratory, 8:54656 (RA;US)
Cherenkov Counters
Other physics experiments at the Homestake Mine, 8:54653 (RA;US)
Liquid Scintillation Detectors
Other physics experiments at the Homestake Mine, 8:54653 (RA;US)
Projection Spark Chambers
Search for proton decay and solar neutrinos with a liquid TPC, 8:54652 (RA;US)
Shower Counters
Design study for a fine-grained multi-kiloton detector for nucleon decay and neutrino studies, 8:54648 (RA;US)
Electronic read-out system for the drift chambers of a neutrino calorimeter, 8:54679 (R;SU;In Russian)

NEUTRINO-NEUTRON INTERACTIONS
Cabibbo Angle
Expected mixing angles or is there evidence for horizontal symmetries?, 8:55154 (BA;US)
Statistical Mechanics
Expected mixing angles or is there evidence for horizontal symmetries?, 8:55154 (BA;US)

NEUTRINO-NUCLEON INTERACTIONS
See also ANTINEUTRINO-NUCLEON INTERACTIONS
NEUTRINO-NEUTRON INTERACTIONS
Structure Functions
Invariant current algebra on the light cone and deep inelastic lepton-hadron scattering. 3. Neutrino reactions, 8:55148 (R;SU;In Russian)

NEUTRINOS
See also COSMIC NEUTRINOS
SOLAR NEUTRINOS
Mass
Lepton nonconservation and double beta decay, 8:55125 (RA;US)
Proposal for the establishment of a national underground physics laboratory, 8:54656 (RA;US)
Oscillations
Neutrino-oscillation experiments at Brookhaven National Laboratory, 8:55127 (R;US)
Other physics experiments at the Homestake Mine, 8:54653 (RA;US)
Prospects for very large, sensitive water Cherenkov detectors for proton decay and neutrino oscillations search, 8:54650 (RA;US)
Reviews
Neutrino physics, 8:55128 (RA;XC)

NEUTRON ABSORBERS
Validation
Criticality control of packagings loaded with nuclear spent fuel, 8:53562 (RA;US)

NEUTRON ACTIVATION ANALYSIS
See NEUTRON REACTIONS

NEUTRON BEAMS
Collimators
Variable aperture neutron collimator, 8:54626 (J;NL)

NEUTRON CAPTURE
See NEUTRON REACTIONS

NEUTRON DETECTION
Campbelling Circuits
Wide range in-core neutron measurement system used in the Windscale AGR concluding experiments, 8:53882 (R;XA)
Fission Chambers
Wide range in-core neutron measurement system used in the Windscale AGR concluding experiments, 8:53882 (R;XA)
Plastic Scintillation Detectors
Application of the plastic scintillator counter for measuring the high-energy neutron spectra, 8:54700 (R;SU;In Russian)

NEUTRON DIFFRACTION
Research Programs
Research within the coordinated programme on neutron scattering techniques in applied research. Final report for the period 1 October 1978 - 31 December 1981, 8:55202 (R;XA)

NEUTRON DOSIMETRY
Dielectric Track Detectors
Calibration of a special neutron dosemeter based on solid-state track detectors and fission radiators in various neutron fields, 8:54742 (R;DD;In German)
Model for calculating the neutron sensitivity of organic solid-state track detectors, 8:54745 (R;DD;In German)
Multi-channel spark counter for reading neutron dosemeters with plastic track detectors, 8:54744 (R;DD;In German)
Study of the properties of cellulose triacetate foils used as solid-state track detectors for neutrons, 8:54743 (R;DD;In German)
Etching
Model for calculating the neutron sensitivity of organic solid-state track detectors, 8:54745 (R;DD;In German)
Range
Study of the properties of cellulose triacetate foils used as solid-state track detectors for neutrons, 8:54743 (R;DD;In German)
Thermoluminescent Dosemeters
Calculation of the neutron sensitivity of thermoluminescent detectors. 1. Fundamentals, 8:54738 (R;DD;In German)
Calculation of the neutron sensitivity of thermoluminescent detectors. 2. Relative light conversion ratio for various thermoluminescent detectors as a function of the LET, 8:54739 (R;DD;In German)
Homogeneous TL dosemeter for direct reading of the biological radiation exposure in mixed neutron-gamma fields, 8:54735 (R;DD;In German)

NEUTRON ECONOMY
See NEUTRON FLUX

NEUTRON FLUX
Measuring Methods
Study of a large scale neutron measurement channel, 8:54670 (R;FR;In French)
P3-Approximation
Calculating the thermal neutron fields in polycells with "black" blocks using the one-velocity p3-approximation and Monte-Carlo method, 8:53965 (R;SU;In Russian)
Spatial Distribution
Detection of flux perturbations in pebble bed HTGRs by near core instrumentation, 8:53883 (R;XA)

NEUTRON FLUX DENSITY
See NEUTRON FLUX

NEUTRON LEAKAGE
Boltzmann Equation
Particle and radiation leakage importance: definition, analysis, and interpretation, 8:53925 (J;US)

NEUTRON LIFETIME LOG
See NEUTRON-NEUTRON LOGGING

NEUTRON LOGGING
See also NEUTRON-NEUTRON LOGGING
High-Voltage Pulse Generators
High-voltage supply for neutron tubes in well-logging applications, 8:54783 (P;US)

NEUTRON MATTER
See NUCLEAR MATTER

NEUTRON REACTIONS
Capture
Search for radiative capture of neutrons in nuclei stimulated by the electric field of a laser wave, 8:55186 (R;SU;In Russian)
Charge-Exchange Reactions
Study on the $^{22}Na(n,p)^{22}Ne$ reaction at the neutron energy up to 1000 eV, 8:55178 (R;SU;In Russian)
Elastic Scattering
Differential neutron scattering cross sections and average neutron parameters of tin isotopes, 8:55187 (R;SU;In Russian)
Integral Cross Sections
Evaluation of the (n,2n) and (n,3n) cross-sections for heavy nuclei with allowance for non-equilibrium processes, 8:55199 (R;XA)
P Invariance
Parity nonconservation in neutron resonances (0.88 eV ^{81}Br, 4.53 eV ^{111}Cd, 1.33 eV ^{117}Sn, 0.75 eV ^{139}La neutron resonances), 8:55180 (R;SU;In Russian)
Particle Production
Hyperon production in nC interactions in the neutron beam with approximately 40 GeV/c momentum, 8:55139 (R;SU;In Russian)
Resonance Scattering
Parity nonconservation in neutron resonances (0.88 eV ^{81}Br, 4.53 eV ^{111}Cd, 1.33 eV ^{117}Sn, 0.75 eV ^{139}La neutron resonances), 8:55180 (R;SU;In Russian)
Total Cross Sections
Analysis of americium and curium resonance parameters, 8:55196 (R;SU;In Russian)

NEUTRON SOURCE FACILITIES
Materials Testing
Irradiations at the Rotating Target Neutron Source-II. 1982 annual report: Joint US-Japan Sponsorship, 8:55307 (R;US)

NEUTRON SOURCES
Excludes reactors even when used as neutron sources.
High-Voltage Pulse Generators
High-voltage supply for neutron tubes in well-logging applications, 8:54783 (P;US)
Neutron Spectra
Experimental verification of the neutron spectrum from the NBS D_2O-moderated ^{252}Cf source, 8:55212 (R;US)
Pulsed Neutron Techniques
Condensed matter research at the Los Alamos pulsed neutron source (WNR), 8:55118 (J;NL)
Pulsed neutrons: One year of experience with the new source at Argonne National Laboratory, 8:55117 (J;NL)
Ultracold Neutrons
Experimental studies on the production of ultra cold neutrons by using an accelerator neutron source, 8:53732 (R;JP;In Japanese)

NEUTRON SPECTRA
Eigenvalues
Eigenvalue-dependent neutron energy spectra: Definitions, analyses, and applications, 8:53924 (J;US)

NEUTRON SPECTROSCOPY
Solid Scintillation Detectors
Simultaneous spectral measurement of fast neutrons and rays with an organic scintillator, 8:54753 (TJ;US)

NEUTRON STARS
Nuclear Reactions
Nuclear physics problems for accreting neutron stars, 8:55095 (R;US)

NEUTRON TRANSPORT
Computerized Simulation
Capabilities of the BRAND program complex for simulating the neutron-physical experiments by the Monte-Calo method, 8:53914 (R;SU;In Russian)

NEUTRON-NEUTRON LOGGING
Calibration
Model for water factor measurements with fission-neutron logging tools. National Uranium Resource Evaluation, 8:54781 (R;US)

NEUTRON-RICH ISOTOPES
Mass
Calculation of nuclear properties far from the line of β stability, 8:55189 (R;US)

NEUTRONS
See also FAST NEUTRONS
PHOTONEUTRONS
Particle Production
Characteristics of secondary neutrons in the πp p, π^- n, π^- ^{12}C interactions at P--40 GeV/c, 8:55174 (R;SU;In Russian)
Weak Particle Decay
Results from the Soudan 1 detector, 8:55124 (RA;US)

NEVADA
Calderas
Relation of mercury, uranium, and lithium deposits to the McDermitt caldera complex, Nevada-Oregon, 8:53466 (R;US)
Radiological Personnel
Radiological assistance teams, 8:53707 (RA;US)

NEW ENGLAND
See FEDERAL REGION I

NEW MEXICO
Abandoned Sites
Gnome site decontamination and decommissioning project, 8:53618 (RA;US)
Salt Deposits
Environmental characterization of bedded salt formations and overlying areas of the Permian Basin, 8:53689 (R;US)
Uranium Mines
Use of PRIM code to analyze potential radiation-induced genetic and somatic effects to man from Jackpile-Paguate mines, 8:55030 (RA;US)

NEW YORK
Stationary Pollutant Sources
Impact of New York state emission sources on Class 1 areas, 8:54894 (J;NL)

NICKEL
Activation Analysis
Elemental composition of human and animal milk. A review. A report prepared under the auspices of the IAEA in collaboration with the WHO, 8:54983 (R;XA)
Biological Accumulation
Bioaccumulation kinetics and organ distribution of nickel in the marine clam (Protothaca staminea), 8:54949 (J;US)
Catalytic Effects
Cooperative investigation by Auburn University and Cities Service Research and Development Company of combined coal and heavy-resid processing. Quarterly report, January 15, 1983-April 15, 1983, 8:53345 (R;US)
Helium
Spectroscopic investigations of the physical state of helium in small bubbles in aluminium and nickel films, 8:54218 (R;DE;In German)
Sintering
Mechanisms of elevated-temperature rupture in single-phase ceramics. Progress report, February 1, 1983-January 31, 1984, 8:54254 (R;US)
Tissue Distribution
Bioaccumulation kinetics and organ distribution of nickel in the marine clam (Protothaca staminea), 8:54949 (J;US)

NICKEL 60
Energy-Level Transitions
Inelastic scattering of ^{16}O from ^{60}Ni at 114 MeV, 8:55181 (J;NL)

NICKEL 60 TARGET
Oxygen 16 Reactions
Inelastic scattering of ^{16}O from ^{60}Ni at 114 MeV, 8:55181 (J;NL)

NICKEL 62 TARGET
Chlorine 35 Reactions
Fusion of heavy ions in an interaction potential model, 8:55168 (R;PL;In Polish)

NICKEL ALLOYS
See also ALLOY-A-286
MARAGING STEELS
NICKEL BASE ALLOYS
STAINLESS STEEL-21-6-9

Corrosion
Durability of marker materials for nuclear waste isolation sites, 8:53670 (R;US)
Physical Radiation Effects
Comparison of the effect of electron and ion irradiation on crystallization of amorphous alloys (62Fe16Cr8Ni14W; 50Mo50Ni), 8:54235 (RA;US)
Crystalline-amorphous transition in NiTi alloys induced by high-energy electron irradiation, 8:54234 (RA;US)
Effects of HVEM irradiation on ordered phases in Ni-Ti, 8:54220 (RA;US)
Swelling of high-nickel Fe-Ni-Cr alloys in EBR-II (Contribution to DAFS quarterly), 8:53929 (R;US)
Service Life
Durability of marker materials for nuclear waste isolation sites, 8:53670 (R;US)
Weathering
Durability of marker materials for nuclear waste isolation sites, 8:53670 (R;US)

NICKEL BASE ALLOYS
Deformation
Micrographic detection of plastic deformation in nickel-base alloys, 8:54544 (P;US)
Nondestructive Testing
Micrographic detection of plastic deformation in nickel-base alloys, 8:54544 (P;US)
Physical Radiation Effects
Disordering under HVEM irradiation (Ni_3Al; Ni_3Fe; NiAl; FeAl), 8:54224 (RA;US)
Order-disorder transition in Ni_4Mo induced by electron irradiation in a high-voltage microscope, 8:54221 (RA;US)
Thermodynamics
Thermodynamics of carbon in Ni-C alloys from 900 to 1215°C, 8:54247 (J;US)

NICKEL BORIDES
Crystal Growth
Growth and properties of $Ni_{30.3}Ti_{3.7}B_6$ (tau-phase) crystals, 8:54265 (J;NL)

NICKEL-IRON BATTERIES
See IRON-NICKEL BATTERIES

NICOTIANA
Metabolism
Metabolic changes associated with shoot formation in tobacco callus cultures, 8:54968 (R;US)
Plant Growth
Metabolic changes associated with shoot formation in tobacco callus cultures, 8:54968 (R;US)

NIEDERAICHBACH REACTOR
Reactor Decommissioning
Plans and activities for decommissioning of LWR power plants by the German utilities, 8:54003 (RA;US)
Safe containment of the Niederaichbach Nuclear Power Station (KKN), 8:53993 (RA;US)

NIM
See NUCLEAR INSTRUMENT MODULES

NIOBIUM
Recovery
Process for recovering niobium from uranium-niobium alloys, 8:53687 (P;US)
Thermal Conductivity
Analysis of thermal conductivity data for fourteen elements in normal and superconducting states. State-of-the-art report, 8:54206 (R;US)
Transition Temperature
Analysis of thermal conductivity data for fourteen elements in normal and superconducting states. State-of-the-art report, 8:54206 (R;US)

NIOBIUM 93 TARGET
Alpha Reactions
Reactions induced on ^{93}Nb by α particles up to 140 MeV, 8:55182 (RA;FR)
Proton Reactions
Deuteron production in proton-nucleus interactions at 7.5 GeV/c, 8:55183 (R;SU;In Russian)

NIOBIUM ALLOYS
See also INCONEL 600
NIOBIUM BASE ALLOYS
Physical Radiation Effects
Spallation and 14-MeV neutron irradiation of stabilized NbTi superconductors, 8:55282 (R;US)
Pyrochemical Reprocessing
Process for recovering niobium from uranium-niobium alloys, 8:53687 (P;US)

NIOBIUM BASE ALLOYS
Physical Radiation Effects
Migration of interstitials in βNb-Zr alloys during electron irradiation by using a high voltage electron microscope, 8:54229 (RA;US)

NIOBIUM OXIDES
Catalytic Effects
Hydrous metal oxide ion exchangers as hydrogenation catalysts for direct coal liquefaction, 8:53360 (J;US)

NITRATES
See also AMMONIUM NITRATES
PETN
URANYL NITRATES
Soil Chemistry
Nitrate distribution in Mojave Desert soils, 8:54914 (J;US)

NITRIFICATION
Inhibition
Inhibition of nitrification by chromium in a biodisc system, 8:55068 (R;US)

NITRO COMPOUNDS
See also NITROBENZENE
NITROMETHANE
TNT
Detonations
Detonation temperature of some liquid explosives, 8:54844 (RA;US)
Role of excited electronic states in the bond-scission process in detonation reactions, 8:54795 (RA;US)
Sensitivity
Some comments regarding the sensitivities, thermal stabilities, and explosive performance characteristics of fluorodinitromethyl compounds, 8:54794 (RA;US)
Thermodynamic Properties
Some comments regarding the sensitivities, thermal stabilities, and explosive performance characteristics of fluorodinitromethyl compounds, 8:54794 (RA;US)

NITROBENZENE
Excitation
Electron-transfer quenching vs. exciplex-mediated quenching of the low-lying excited states in phthalocyanines, 8:54315 (J;US)

NITROGEN
Activation Analysis
Elemental composition of human and animal milk. A review. A report prepared under the auspices of the IAEA in collaboration with the WHO, 8:54983 (R;XA)
Atmospheric Chemistry
Estimates for the long-range transport of air pollution, 8:54892 (J;NL)

NITROGEN 14 REACTIONS
Fusion Reactions
Calculation of fusion cross sections, 8:55175 (R;DD;In German)

NITROGEN DIOXIDE
NO_2.
Ecological Concentration
National Performance Audit Program. Ambient air audits of analytical proficiency, 1981, 8:54904 (R;US)
Measuring Methods
Application of photothermal techniques for trace detection of NO_2 in the troposphere, 8:54878 (R;US)

NITROGEN FIXATION
Research Programs
Nitrogen fixation by tree crops, 8:54990 (RA;XA)
Nitrogen fixation by cover crops, 8:54991 (RA;XA)

NITROGEN NITRIDES
See NITROGEN

NITROGEN OXIDES
See also NITROGEN DIOXIDE
NITROUS OXIDE

Air Pollution Abatement
Nox abatement for stationary sources in Japan. Final report, January 1982-January 1983, 8:54561 (R;US)
Atmospheric Chemistry
Mechanism and rates of the gas phase oxidations of sulfur dioxide and the nitrogen oxides in the atmosphere, 8:54887 (R;US)
Electron Attachment
Electron-molecule interactions in gases and liquids: the electron-attachment process in gases and nonpolar liquids, 8:55110 (R;US)
Manuals
NO/sub x/ information book (Contains glossary), 8:54903 (R;US)
Scrubbing
Scrubbing of gaseous nitrogen oxides in packed towers, 8:53476 (J;US)
Standards
NO/sub x/ information book (Contains glossary), 8:54903 (R;US)

NITROGLYCERIN
Detonations
Detonation temperature of some liquid explosives, 8:54844 (RA;US)

NITROMETHANE
Detonations
Brightness temperature of detonation wave in nitromethane-tetranitromethane mixtures and in gaseous mixtures at a high initial pressure, 8:54845 (RA;US)
Detonation temperature of some liquid explosives, 8:54844 (RA;US)
Effect of cavitation on the shock sensitivity of liquid explosives, 8:54817 (RA;US)
Influence of additives on nitromethane detonation characteristics, 8:54829 (RA;US)
Low-velocity detonation of nitromethane, 8:54828 (RA;US)
Theory to predict the velocity-diameter relation of explosives, 8:54830 (RA;US)
Sensitivity
Effect of cavitation on the shock sensitivity of liquid explosives, 8:54817 (RA;US)

NITRONIC 40
See STAINLESS STEEL-21-6-9

NITROUS OXIDE
N_2O.
Energy Transfer
Kinetics of elementary atom and radical reactions. Progress report, 8:55111 (R;US)

NMR
See NUCLEAR MAGNETIC RESONANCE

NOISE (REACTOR)
See REACTOR NOISE

NOISE THERMOMETERS
Performance
High temperature measurement by noise thermometry, 8:53881 (R;XA)

NOK-1 REACTOR
See BEZNAU-1 REACTOR

NONRADIOACTIVE WASTE DISPOSAL
See WASTE DISPOSAL

NONRADIOACTIVE WASTES
See LIQUID WASTES
SOLID WASTES

NORTH ATLANTIC REGION
See FEDERAL REGION I

NORTH CAROLINA
Coastal Waters
Review and evaluation of oil spill models for application to North Carolina waters. Final report, 8:54944 (R;US)
Energy Sources
North Carolina Energy Institute. Annual report, 1982, 8:54070 (R;US)

NORTH DAKOTA
Coal Gasification Plants
Great Plains Gasification Associates. Quarterly technical and environmental report, Great Plains coal gasification project, Mercer County, North Dakota, second quarter, 1983, 8:53336 (R;US)

NORTHERN IRELAND
See UNITED KINGDOM

NORWAY
Fluidized-Bed Combustion
Fluidised bed combustion. an overview of the Norwegian program, 8:53421 (R;US)
Water Quality
Polychlorinated biphenyls in the sediments of the Inner Oslofjord, 8:54947 (J;NL)

NOVA FACILITY
Pockels Cell
Low-jitter, hydrogen thyratron Pockels cell driver, 8:55309 (R;US)

NPR REACTOR
See N-REACTOR

N-REACTOR
Fuel Assemblies
Isotopic composition of irradiated Mark IV and Mark IA fuel, 8:53984 (R;US)

NSLS
Electron Spectrometers
Spectrometer coupled to an electron storage ring for tagging laser backscattered gamma rays, 8:54631 (R;US)
Power Supplies
Problem of magnet ramping, 8:54634 (R;US)

NUCLEAR CONTROVERSY
See HUMAN POPULATIONS

NUCLEAR DATA COLLECTIONS
Data Covariances
Annotated bibliography covering generation and use of evaluated cross section uncertainty files, 8:55160 (R;US)

NUCLEAR ENERGY
Risk Assessment
Approach for determining the acceptable levels of nuclear risk, 8:54072 (R;CA)

NUCLEAR EXPLOSION DETECTION
Attenuation of seismic waves at regional distances. Final technical report 1 Oct 78-30 Sep 82, 8:54872 (R;US)
Regional discrimination with broadband data. Final report 1 Oct 81-30 Sep 82, 8:54873 (R;US)

NUCLEAR EXPLOSIONS
Specifically named single nuclear explosions are listed by name and the word EVENT, e.g., BOXCAR EVENT. All projects involving nuclear explosions are listed by the project name and the word PROJECT, e.g., PLOWSHARE PROJECT.
Craters
Relative apparent radii of craters in various soils, 8:54868 (R;US)
Electromagnetic Pulses
Physical and computer modeling of military earth grounding practices in a HEMP (high-altitude electromagnetic pulse) environment. Technical memo, 8:54757 (R;US)
Environmental Effects
Environmental radiation at the Monte Bello Islands from nuclear weapons tests conducted in 1952 and 1956, 8:54919 (R;AU)
Simulation
Evaluation of AURORA as a tactical source region simulation. Contractor report, 8:54754 (R;US)
Parameter survey for collisionless coupling in a laser simulation of hane (high altitude nuclear explosion). Memorandum report, 8:54870 (R;US)

NUCLEAR FACILITIES
See also FEED MATERIALS PLANTS
FUEL FABRICATION PLANTS
FUEL REPROCESSING PLANTS
NUCLEAR POWER PLANTS
RADIOACTIVE WASTE FACILITIES
Decommissioning
Aerosols from metal cutting techniques typical of decommissioning nuclear facilities - inhalation hazards and worker protection, 8:53690 (RA;US)
Aerosols from metal cutting techniques typical of decommissioning nuclear facilities - experimental system for collection and characterization, 8:53691 (RA;US)
Decommissioning of radioactively contaminated facilities from a state perspective, 8:53609 (RA;US)

Decommissioning engineering within the framework of the French nuclear structure, 8:53635 (RA;US)
Decontamination of the Frankford Arsenal, 8:53614 (RA;US)
Development of improved technology for decommissioning operations, 8:53620 (RA;US)
Evaluation of nuclear facility decommissioning projects program, 8:53634 (RA;US)
Experience in treatment of components, waste treatment, packaging and shipping related to decommissioning, 8:53935 (RA;US)
Mound's decommissioning experience, tooling, and techniques, 8:53615 (RA;US)
Overview of decommissioning policy, standards and practices in NEA member countries, 8:53607 (RA;US)
Quality assurance as a management tool in decommissioning activities, 8:53630 (RA;US)
Radiation measurement capability for decontamination to unrestricted use, 8:53628 (RA;US)
Radiological planning and implementation for nuclear facility decommissioning, 8:53624 (RA;US)
Status of decommissioning program of US Nuclear Regulatory Commission, 8:53608 (RA;US)
Use of urethane foam in the decontamination and decommissioning of nuclear facilities, 8:53622 (RA;US)
Waste identification, characterization and disposal during the D & D of a non-reactor nuclear facility, 8:53627 (RA;US)
Waste management impacts of US decommissioning activities, 8:53610 (RA;US)

Decontamination
Decontamination of the Frankford Arsenal, 8:53614 (RA;US)
Use of urethane foam in the decontamination and decommissioning of nuclear facilities, 8:53622 (RA;US)
Waste identification, characterization and disposal during the D & D of a non-reactor nuclear facility, 8:53627 (RA;US)

Health Hazards
Considerations in using radiation dosimetry data in epidemiologic studies, 8:55018 (RA;US)
DOE health and mortality study at Oak Ridge, 8:55009 (RA;US)
Epidemiology applied to health physics, 8:55003 (R;US)
Lung cancer among workers at a uranium processing plant, 8:55029 (RA;US)
Mortality among plutonium and other workers at a nuclear facility, 8:55027 (RA;US)

Legal Aspects
Title list of documents made publicly available, June 1-30, 1983. Volume 5 No. 6, 8:53907 (R;US)

Licensing
SCALE: a modular code system for performing standardized computer analyses for licensing evaluation (Additions), 8:53720 (R;US)
SCALE: a modular code system for performing standardized computer analyses for licensing evaluation (Additions), 8:53721 (R;US)

Personnel Dosimetry
Radiation dosimetry for epidemiology lung cancer study, 8:55032 (RA;US)

Radiation Protection
Standard procedures for pooling health physics data for epidemiologic studies, 8:55020 (RA;US)

Safeguards
SAFE users manual. Volume 4. Computer programs (Safeguards Automated Facility Evaluation (SAFE)), 8:53718 (R;US)

NUCLEAR FUEL ELEMENTS
See FUEL ELEMENTS

NUCLEAR FUELS
See also SPENT FUELS

Emission Spectroscopy
Emission spectrographic carrier distillation technique for the determination of trace elements in nuclear fuel materials, 8:53471 (R;PK)

Licensing
SCALE: a modular code system for performing standardized computer analyses for licensing evaluation (Additions), 8:53720 (R;US)
SCALE: a modular code system for performing standardized computer analyses for licensing evaluation (Additions), 8:53721 (R;US)

Quality Control
Emission spectrographic carrier distillation technique for the determination of trace elements in nuclear fuel materials, 8:53471 (R;PK)

Transport
Goal system for comparative assessments of nuclear fuel transport under security aspects, 8:53716 (RA;US)

NUCLEAR INDUSTRY

Health Hazards
Mortality among workers at the Oak Ridge National Laboratory, 8:55008 (RA;US)

Standards
ANSI N14 standards committee, 8:53567 (RA;US)

NUCLEAR INSTRUMENT MODULES

Data Transmission
Standard NIM digital bus (NIM/GPIB), 8:54551 (R;US)

Standards
Standard NIM digital bus (NIM/GPIB), 8:54551 (R;US)
The beginning of ASTM standards for nuclear instrumentation, 8:53949 (J;US)

NUCLEAR MAGNETIC RESONANCE
New developments and opportunities for NMR in metal-hydrogen systems, 8:55218 (R;US)

NUCLEAR MATERIALS MANAGEMENT

Nondestructive Analysis
Parametric effects on nondestructive-assay techniques. Final report, 8:53719 (R;US)

NUCLEAR MATTER

Phase Transformations
Nuclear beams and targets, 8:55198 (RA;XC)

Quark Model
Nuclear beams and targets, 8:55198 (RA;XC)

NUCLEAR PHYSICS
Use only for indexing articles of very broad coverage, such as annual reviews, text books, etc.

Information Theory
Data compression methods in problems of experimental nuclear physics, 8:55115 (R;SU;In Russian)

Tokyo Synchrotron
Nuclear physics experiment at INS, 8:55165 (R;JP)

NUCLEAR POWER

Public Opinion
Approach for determining the acceptable levels of nuclear risk, 8:54072 (R;CA)

NUCLEAR POWER PLANTS

Control Rooms
Task analysis of nuclear-power-plant control-room crews: project approach methodology, 8:53944 (R;US)

Cranes
Safety engineering: KTA Code of Practice. Lifting mechanisms in nuclear plant, 8:53933 (TG;GB)

Economics
Forms of self-supporting relations in the electric power engineering in the presence of nuclear power plants, 8:53911 (R;SU;In Russian)

Personnel Monitoring
Data requirements for meaningful long-term epidemiology study of the commercial nuclear power industry, 8:55021 (RA;US)

Power Generation
Nuclear power plants: structure and function, 8:53867 (R;US)

Radiation Accidents
Evacuation emergency response model coupling atmospheric release advisory capability output, 8:54037 (R;US)

Radiation Hazards
Data requirements for meaningful long-term epidemiology study of the commercial nuclear power industry, 8:55021 (RA;US)

Radiation Monitoring
Intercomparison of some environmental monitoring methods applied at nuclear power plants in Czechoslovakia (Bohunice) and in Hungary (Paks), 8:54925 (R;HU)

Radioactive Effluents
Population dose commitments due to radioactive releases from nuclear power plant sites in 1980, 8:53952 (R;US)
Reactor Decommissioning
Decontamination research in the Commission of European Communities' programme on decommissioning of nuclear power plants, 8:54014 (RA;US)
Utility planning for decommissioning, 8:54010 (RA;US)
Reactor Licensing
Regulatory licensing status summary report. Volume 12, No. 8. Nuclear power plants data for decisions (blue book), August 1-August 31, 1983, 8:53908 (R;US)
Reactor Operators
Task analysis of nuclear-power-plant control-room crews: project approach methodology, 8:53944 (R;US)
Task analysis of nuclear-power-plant control-room crews, 8:53945 (R;US)
Remote Handling Equipment
Safety engineering: KTA Code of Practice. Lifting mechanisms in nuclear plant, 8:53933 (TG;GB)
Risk Assessment
A risk comparison summary, 8:53429 (BA;US)
Site Selection
Measurement of in situ dynamic properties in relation to geologic conditions, 8:53953 (J;US)

NUCLEAR POWER STATIONS
See NUCLEAR POWER PLANTS

NUCLEAR REACTIONS
See also FISSION
PHOTONUCLEAR REACTIONS
THERMONUCLEAR REACTIONS
Cross Sections
Annotated bibliography covering generation and use of evaluated cross section uncertainty files, 8:55160 (R;US)
Quark Matter
Perspectives in high energy nuclear collisions, 8:55190 (R;US)
Quark-gluon plasma formation, 8:55152 (R;US)

NUCLEAR REACTORS
See REACTORS

NUCLEAR SAFETY
See RADIATION PROTECTION

NUCLEAR SHIP OTTO HAHN REACTOR
See OTTO HAHN REACTOR

NUCLEAR SHIPS
Health Hazards
Cancer mortality at a naval nuclear shipyard, 8:55010 (RA;US)

NUCLEAR SPIN RESONANCE
See NUCLEAR MAGNETIC RESONANCE

NUCLEAR STRUCTURE
Resonance
Workshop on the derivation of average resonance parameters, 15-16 Oct 1981, Saclay (France), 8:55200 (J;XN)

NUCLEAR WASTES
See RADIOACTIVE WASTES

NUCLEAR WEAPON TESTS
See NUCLEAR EXPLOSIONS

NUCLEON-NUCLEON INTERACTIONS
Boson-Exchange Models
Meson-exchange Hamiltonian for NN scattering and isobar-nucleus dynamics, 8:55145 (R;US)
Particle Production
Study of the particle production process using nuclear targets. Pt. 3 Effects testable in hadron-nucleon experiments, nature of intermediate objects, conclusion, 8:55149 (R;SU)
Reviews
Nucleon-nucleon interactions and polarized-beam (both proton & antiproton) facilities at LAMPF II, 8:55135 (R;US)

NUCLEONS
See also NEUTRONS
PROTONS
Particle Decay
Proposal for the establishment of a national underground physics laboratory, 8:54656 (RA;US)
Weak Particle Decay
Design study for a fine-grained multi-kiloton detector for nucleon decay and neutrino studies, 8:54648 (RA;US)
Homestake tracking spectrometer: a one-mile deep 1400-ton liquid scintillation nucleon decay detector, 8:54647 (RA;US)
Nuclear reinteraction effects, 8:55126 (RA;US)
Research and development program on dense TPC's at LBL, 8:54651 (RA;US)
Status of the HPW nucleon decay detector, 8:54646 (RA;US)

NUCLIDES
See ISOTOPES

NUMERICAL ANALYSIS
Lectures
Introduction to numerical analysis, 8:55328 (R;FR;In French)

O

OAK RIDGE
Radioactive Waste Disposal
Use of DOE site selection criteria for screening low-level waste disposal sites on the Oak Ridge Reservation, 8:53674 (R;US)

OAK RIDGE NATIONAL LABORATORY
See ORNL

OCCUPATIONAL DISEASES
Epidemiology
Appalachian coal miner mortality study: a 14-year follow-up, 8:53427 (R;US)

OCCUPATIONS
Radiation Hazards
Utilization of epidemiological data in the development of radiation protection recommendations, 8:55017 (RA;US)

OCEAN THERMAL ENERGY CONVERSION
Economics
Development of ocean thermal energy conversion, 8:53797 (RA;US)
Licenses
Permits and regulations applicable to United States ocean thermal energy conversion projects, 8:53798 (R;US)
Permits
Permits and regulations applicable to United States ocean thermal energy conversion projects, 8:53798 (R;US)
Regulations
Permits and regulations applicable to United States ocean thermal energy conversion projects, 8:53798 (R;US)
Resource Potential
Development of ocean thermal energy conversion, 8:53797 (RA;US)

OCEAN THERMAL POWER PLANTS
Design
OTEC power for Hawaii, 8:53796 (RA;US)
Tower-based OTEC design for Hawaii, 8:53795 (RA;US)
Pilot Plants
OTEC power for Hawaii, 8:53796 (RA;US)
Tower-based OTEC design for Hawaii, 8:53795 (RA;US)
Test Facilities
Enhanced test facility for OTEC at Keahole Point, 8:53794 (R;US)

OCEANIA
Energy Policy
Energy programs for Pacific territories, 8:54085 (RA;US)
Renewable Energy Sources
Energy programs for Pacific territories, 8:54085 (RA;US)

OCTANE
Chemical Reaction Yield
Bimetallic anionic formyl complexes: synthesis and properties, 8:54331 (J;US)

OFFICE BUILDINGS
Design
Energy strategy selector for small office building design, 8:54145 (R;US)
Energy Conservation
Energy strategy selector for small office building design, 8:54145 (R;US)

OHIO VALLEY REGION
Air Quality
Ohio River Valley Study. Sites, methods, data summary for 1980. Volume 1. Main report. Report, October 1979-December 1980, 8:54901 (R;US)
Ohio River Valley Study. Sites, methods, data summary for 1980. Volume 2. Appendices. Report for Oct 79-Dec 80, 8:54902 (R;US)
OIL PALMS
Roots
Studies using ^{32}P to determine the distribution and activity patterns of the oil palm root system in Nigeria, 8:54993 (RA;XA)
OIL RESIDUES
See PETROLEUM RESIDUES
OIL SAND DEPOSITS
Exploration
Tar-sand resources of western Kentucky, 8:53450 (RA;US)
Tar sand resource appraisal in south-central Oklahoma, 8:53454 (RA;US)
Geology
Characteristics of tar sands of Alabama, 8:53453 (RA;US)
Resources
Characteristics of tar sands of Alabama, 8:53453 (RA;US)
Propsects for commercial tar sand development: an appraisal of the institutional, technical, and economic factors that affect decisionmaking, 8:53461 (RA;US)
Tar-sand resources of western Kentucky, 8:53450 (RA;US)
Tar sand resources of Utah, 8:53452 (RA;US)
Tars and heavy crude in Texas, 8:53451 (RA;US)
OIL SAND INDUSTRY
Forecasting
Propsects for commercial tar sand development: an appraisal of the institutional, technical, and economic factors that affect decisionmaking, 8:53461 (RA;US)
Research Programs
Heavy oil and oil sands research and development in Alberta, Canada, 8:53458 (RA;US)
OIL SAND OILS
See BITUMENS
OIL SANDS
In-Situ Combustion
Physical-chemical treatment of tar-sand processing wastewater, 8:53462 (R;US)
In-Situ Processing
Conoco's tar sands development in south Texas, 8:53459 (RA;US)
In situ production of heavy oil from Kentucky tar sands, 8:53457 (RA;US)
Meetings
National tar sands (heavy oil) symposium, 8:53448 (R;US)
Processing
Heavy oil and oil sands research and development in Alberta, Canada, 8:53458 (RA;US)
Tarco semi-commercial solvent extraction of tar sands, 8:53456 (RA;US)
US tar sand oil recovery projects, 8:53455 (RA;US)
OIL SATURATION
Measuring Methods
Assessment of gamma-inject logging techniques for the determination of residual oil saturation. Final report (Natural gamma background is first logged then radioactive fluids are injected into depleted reservoirs and the gamma signal returning to the borehole is measured), 8:53431 (R;US)
OIL SHALE PROCESSING PLANTS
Pollution Control
Control technology appendices for pollution control technical manuals. Final report, June 1982-February 1983, 8:53389 (R;US)
Waste Water
Purifying contaminated water, 8:53463 (P;US)
OIL SHALE WASTE WATER
See OIL SHALES
WASTE WATER
OIL SHALES
Geothermometry
Effect of thermal alteration on petrographic constituents of the Hanna No. I coal, 8:53380 (J;US)
Mass Spectroscopy
Direct mass-spectrometric studies of the pyrolysis of carbonaceous fuels. II. Qualitative observations of primary and secondary processes in biomass, 8:53783 (J;NL)
Petrography
Effect of thermal alteration on petrographic constituents of the Hanna No. I coal, 8:53380 (J;US)
Pyrolysis
Direct mass-spectrometric studies of the pyrolysis of carbonaceous fuels. II. Qualitative observations of primary and secondary processes in biomass, 8:53783 (J;NL)
OIL SPILL FINGERPRINTING
See OIL SPILLS
OIL SPILLS
Combustion
Development of a flaring burner disposal system. Final report, 8:53438 (R;US)
Computerized Simulation
Oil spill incidence simulation model: description and user's manual, 8:53442 (R;US)
Economic Impact
Beach communities and oil spills: environmental and economic consequences for Brunswick County, North Carolina. Summary report, 8:54957 (R;US)
Environmental Effects
Potential damage of oil wastes in coastal estuary sediments, 8:53441 (R;US)
Environmental Impacts
Beach communities and oil spills: environmental and economic consequences for Brunswick County, North Carolina. Summary report, 8:54957 (R;US)
Environmental Transport
Hydrocarbon spills, their retention in the subsurface and propagation into shallow aquifers, 8:54943 (R;US)
Surface drifter study - Beaufort Sea, Alaska. Final report, 8:53437 (R;US)
Mathematical Models
Oil spill incidence simulation model: description and user's manual, 8:53442 (R;US)
Review and evaluation of oil spill models for application to North Carolina waters. Final report, 8:54944 (R;US)
Toxicity
Potential damage of oil wastes in coastal estuary sediments, 8:53441 (R;US)
OIL WELLS
Caustic Flooding
Improved secondary oil recovery by controlled waterflooding-pilot demonstration: Ranger Zone, Fault Block VII, Wilmington Field. Phase IV. Quarterly report, April-June 1983, 8:53433 (R;US)
Directional Drilling
Wellbore inertial directional surveying system, 8:53436 (P;US)
Economics
Indexes and estimates of domestic well drilling costs, 1982 and 1983, 8:53444 (R;US)
Gamma Logging
Assessment of gamma-inject logging techniques for the determination of residual oil saturation. Final report (Natural gamma background is first logged then radioactive fluids are injected into depleted reservoirs and the gamma signal returning to the borehole is measured), 8:53431 (R;US)
Reservoir Rock
Development of an improved method for the analysis of pressure-core samples. Final report, 8:53432 (R;US)
Steam Injection
Downhole steam generator using low pressure fuel and air supply, 8:53435 (P;US)
Well Logging
Wellbore inertial directional surveying system, 8:53436 (P;US)
OKLAHOMA
Oil Sand Deposits
Tar sand resource appraisal in south-central Oklahoma, 8:53454 (RA;US)
Salt Deposits
Environmental characterization of bedded salt formations and overlying areas of the Permian Basin, 8:53689 (R;US)

OLEFINS
See ALKENES
OLIVE TREES
Fertilizers
Olive and citrus tree crops and their fertilization in Greece: Field studies with ^{15}N labelled fertilizers, 8:54985 (RA;XA)
ON-LINE COMPUTERS
See COMPUTERS
ON-LINE MEASUREMENT SYSTEMS
Data Processing
Software for the AIST measurement and calculational complex. Service routines for editing and statistical processing files on a magnetic tape, 8:53939 (R;SU;In Russian)
Operation
Software for the AIST measurement and calculational complex. Service routines for editing and statistical processing files on a magnetic tape, 8:53939 (R;SU;In Russian)
ONTARIO
Environmental Quality
Accumulation of atmospherically deposited metals in wetland soils of Sudbury, Ontario, 8:54912 (J;NL)
OPTICAL ACTIVITY
Measuring Instruments
Ultrasensitive optical rotation and refractive-index measurements, 8:54294 (R;US)
OPTICAL EQUIPMENT
Supports
Precision support of annular optics, 8:54479 (R;US)
OREGON
Calderas
Relation of mercury, uranium, and lithium deposits to the McDermitt caldera complex, Nevada-Oregon, 8:53466 (R;US)
Geothermal Exploration
Geothermal hydrology of Warner Valley, Oregon: a reconnaissance study, 8:53829 (R;US)
Heat Flow
Geothermal hydrology of Warner Valley, Oregon: a reconnaissance study, 8:53829 (R;US)
Hydrology
Geothermal hydrology of Warner Valley, Oregon: a reconnaissance study, 8:53829 (R;US)
ORGANIC ACIDS
Excluding NUCLEIC ACIDS and NUCLEOTIDES.
See also CARBOXYLIC ACIDS
Chemical Reactions
Facile reaction/extraction of coal with supercritical fluids. Quarterly technical progress report, April 1, 1983-June 30, 1983 (In Benzene), 8:53344 (R;US)
Solubility
Facile reaction/extraction of coal with supercritical fluids. Quarterly technical progress report, April 1, 1983-June 30, 1983 (In Benzene), 8:53344 (R;US)
ORGANIC COMPOUNDS
See also AMINES
AROMATICS
HYDROCARBONS
KETONES
ORGANIC ACIDS
ORGANIC NITROGEN COMPOUNDS
ORGANIC OXYGEN COMPOUNDS
ORGANIC PHOSPHORUS COMPOUNDS
ORGANIC SULFUR COMPOUNDS
PROTEINS
Electron Attachment
Electron-molecule interactions in gases and liquids: the electron-attachment process in gases and nonpolar liquids, 8:55110 (R;US)
ORGANIC FLUORINE COMPOUNDS
Sensitivity
Some comments regarding the sensitivities, thermal stabilities, and explosive performance characteristics of fluorodinitromethyl compounds, 8:54794 (RA;US)
Thermodynamic Properties
Some comments regarding the sensitivities, thermal stabilities, and explosive performance characteristics of fluorodinitromethyl compounds, 8:54794 (RA;US)
ORGANIC NITROGEN COMPOUNDS
Excluding PROTEINS, AMINES, ALKALOIDS, AMINO ACIDS, NUCLEIC ACIDS, and NUCLEOTIDES.
See also DIAZO COMPOUNDS
NITRO COMPOUNDS
Mutagen Screening
Identification of mutagenic constituents in coal combustion fly ash, 8:53428 (R;US)
Quantitative Chemical Analysis
Identification of mutagenic constituents in coal combustion fly ash, 8:53428 (R;US)
ORGANIC OXYGEN COMPOUNDS
Excluding HYDROXY COMPOUNDS, CARBONIC ACID DERIVATIVES, LIPIDS, STEROIDS, CARBOHYDRATES, ORGANIC ACIDS, ALDEHYDES, KETONES and ESTERS.
See also ETHERS
Mutagen Screening
Identification of mutagenic constituents in coal combustion fly ash, 8:53428 (R;US)
NMR Spectra
Cross polarization and magic angle sample spinning NMR spectra of model organic compounds. 2. Molecules of low or remote protonation, 8:54335 (J;US)
Quantitative Chemical Analysis
Identification of mutagenic constituents in coal combustion fly ash, 8:53428 (R;US)
ORGANIC PHOSPHORUS COMPOUNDS
Excluding NUCLEIC ACIDS and NUCLEOTIDES.
See also PHOSPHONIC ACID ESTERS
Electronic Structure
Molecular and electronic structure of phosphonium cyclopropylide ($H_3P = C(CH_3)_2$): a theoretical study, 8:54325 (J;US)
Molecular Structure
Molecular and electronic structure of phosphonium cyclopropylide ($H_3P = C(CH_3)_2$): a theoretical study, 8:54325 (J;US)
ORGANIC SOLVENTS
Comparative Evaluations
Solvent tailoring in coal liquefaction. Quarterly report, August 1982-November 1982, 8:53339 (R;US)
Solvent tailoring in coal liquefaction. Quarterly report, February 1982-May 1982 (In many cases the simple organic compounds listed were hydrogenated), 8:53340 (R;US)
Decomposition
Improving the quality of deteriorated recycle solvents. Quarterly report, August 1982-November 1982, 8:53343 (R;US)
Hydrogen Transfer
Solvent tailoring in coal liquefaction. Quarterly report, February 1982-May 1982 (In many cases the simple organic compounds listed were hydrogenated), 8:53340 (R;US)
Hydrogenation
Solvent tailoring in coal liquefaction. Quarterly report, February 1982-May 1982 (In many cases the simple organic compounds listed were hydrogenated), 8:53340 (R;US)
Phase Studies
Solvent tailoring in coal liquefaction. Quarterly report, May 1982-August 1982 (Comparison of subcritical and supercritical conditions), 8:53338 (R;US)
Volatility
Solvent tailoring in coal liquefaction. Quarterly report, August 1982-November 1982, 8:53339 (R;US)
ORGANIC SULFUR COMPOUNDS
See also METHIONINE
THIOPHENE
Gas Chromatography
Analysis of lignite liquefaction products processed with syngas and hydrogen sulfide, 8:53381 (J;US)
Removal
Kinetics of organic sulfur removal from coal by oxydesulfurization, 8:53417 (RA;US)
ORGANIZATIONAL MODELS
Economics
Mathematical model of a utility firm. Final technical report, Part III, 8:54100 (R;US)

ORNL
Personnel
Mortality among workers at the Oak Ridge National Laboratory, 8:55008 (RA;US)
Test Facilities
Drop test facility available to private industry, 8:54402 (RA;US)
ORYZA
See RICE
OSCILLATIONS (PLASMA)
See PLASMA WAVES
OSMIUM COMPLEXES
Electronic Structure
Concerning the electronic structure of the ions M(bpy)$_n$3i (M = Fe, Ru, Os; bpy = 2,2'-bipyridine), 8:54330 (J;US)
Excitation
Concerning the electronic structure of the ions M(bpy)$_n^{3+}$ (M = Fe, Ru, Os; bpy = 2,2'-bipyridine), 8:54330 (J;US)
NMR Spectra
Interconversion of methylene and ketene ligands on a triosmium cluster. Crystal and molecular structure of the ketene complex $Os_3(CO)_{12}$(eta^2(C,C,μ-CH_2CC , 8:54329 (J;US)
X-Ray Diffraction
Interconversion of methylene and ketene ligands on a triosmium cluster. Crystal and molecular structure of the ketene complex $Os_3(CO)_{12}$(eta^2(C,C,μ-CH_2CO), 8:54329 (J;US)
OSTEOSARCOMAS
Latency Period
Age and dose as determinants of times of appearance of radium-induced osteosarcomas in humans, 8:55026 (RA;US)
Radioinduction
Age and dose as determinants of times of appearance of radium-induced osteosarcomas in humans, 8:55026 (RA;US)
OTEC
See OCEAN THERMAL ENERGY CONVERSION
OTTO HAHN REACTOR
Reactor Decommissioning
Decommissioning of NS OTTO HAHN, 8:53992 (RA;US)
Packaging, transportation and disposal of nuclear parts from decommissioning of N.S. OTTO HAHN, 8:54018 (RA;US)
Reactor Dismantling
Decommissioning of NS OTTO HAHN, 8:53992 (RA;US)
Packaging, transportation and disposal of nuclear parts from decommissioning of N.S. OTTO HAHN, 8:54018 (RA;US)
OUTER CONTINENTAL SHELF
See CONTINENTAL SHELF
OVARIES
Dose Equivalents
Evaluation of the radiation doses to uranium mine employees exposed to external gamma radiation, 8:54999 (R;AU)
OVERBURDEN
Mineralogy
Clay minerals in Northern Plains coal overburden as measured by X-ray diffraction, 8:54916 (J;US)
OXETANE
See ETHERS
OXIDASES
See OXIDOREDUCTASES
OXIDOREDUCTASES
Code number 1.
Biological Functions
Respiration of roots. Response to low O_2 stress. Final report, 8:54981 (R;US)
OXOPROPANE
See ACETONE
OXYGEN
Atom-Molecule Collisions
Kinetics of elementary atom and radical reactions. Progress report (O atom + H molecule.), 8:55111 (R;US)
Chemisorption
Studies on aged H-Coal catalysts. Final report, 8:53350 (R;US)
Electron Attachment
Electron-molecule interactions in gases and liquids: the electron-attachment process in gases and nonpolar liquids, 8:55110 (R;US)
Excitation
Study of $O_2(^1\Delta)$ production by nuclear pumping. Final report submitted to the Air Force Weapons Laboratory, 8:54509 (R;US)
Photochemistry
Rate constants for the decay and reactions of the lowest electronically excited singlet state of molecular oxygen in solution, 8:54343 (J;US)
Removal
Studies on aged H-Coal catalysts. Final report, 8:53350 (R;US)
OXYGEN 16
Binding Energy
Binding energy calculations using the molecular orbital wave function, 8:55167 (R;XA)
OXYGEN 16 REACTIONS
Fusion Reactions
Calculation of fusion cross sections, 8:55175 (R;DD;In German)
Fusion of heavy ions in an interaction potential model, 8:55168 (R;PL;In Polish)
Inelastic Scattering
Inelastic scattering of ^{16}O from ^{60}Ni at 114 MeV, 8:55181 (J;NL)
OXYGEN 16 TARGET
Carbon 12 Reactions
Fusion of heavy ions in an interaction potential model, 8:55168 (R;PL;In Polish)
Chlorine 35 Reactions
Fusion of heavy ions in an interaction potential model, 8:55168 (R;PL;In Polish)
Oxygen 16 Reactions
Fusion of heavy ions in an interaction potential model, 8:55168 (R;PL;In Polish)
OXYGEN 18
Isotope Effects
Quantum effects of high-frequency modes in inorganic electron transfer: kinetic isotope effects in redox reactions of $[Fe(H_2O)_6]^{2+}$, $[Fe(D_2O)_6]^{2+}$, and $Fe[(^{18}OH_2)_6]^{2+}$, 8:54310 (J;US)
OXYGEN EFFECT (RADIOBIOLOGY)
See OXYGEN
OXYGEN HYDRIDES
See WATER
OZONE
Ecological Concentration
MFR total ozone grid point data, 8:54877 (R;US)
Photolysis
Study of $O_2(^1\Delta)$ production by nuclear pumping. Final report submitted to the Air Force Weapons Laboratory, 8:54509 (R;US)

P

PACIFIC ISLANDS
See OCEANIA
PACIFIC NORTHWEST REGION
See FEDERAL REGION X
PACKAGING
Certification
Upgrading the DOT 6M-2R shipping package, 8:54435 (RA;US)
Comparative Evaluations
Review of DOE waste package program. Subtask 1.1. National waste package program, October 1982-March 1983. Vol. 4, 8:53652 (R;US)
Crushing
Interactions between crush conditions and fire resistance for Type B packages less than 500 kg, 8:54390 (RA;US)
Justification and advantages of crushing tests compared with fall tests and the modification of existing regulations, 8:54392 (RA;US)

Testing to define the sensitivity of small Type B packagings to the proposed IAEA crush test requirement, 8:54391 (RA;US)
Design
Design of radioactive material shipping packaging for low-velocity puncture resistance, 8:54388 (RA;US)
Development of waste package designs for disposal in a salt repository, 8:53639 (RA;US)
Fatigue design of TRUPACT-1, 8:54446 (RA;US)
Puncture protection for the TRUPACT system, 8:54389 (RA;US)
Quality assurance in packaging design through the peer review process, 8:54456 (RA;US)
TRansuranic PACkage Transporter (TRUPACT) system design status and operational support equipment (Suitable for truck or rail transport), 8:54400 (RA;US)
Fatigue
Fatigue design of TRUPACT-1, 8:54446 (RA;US)
Fire Resistance
Development of a large fire test facility for packaging thermal testing, 8:54443 (RA;US)
Interactions between crush conditions and fire resistance for Type B packages less than 500 kg, 8:54390 (RA;US)
Gaskets
Elastomere gasket: a black sheep for quality assurance measures, 8:54457 (RA;US)
Heat Transfer
Heat transfers: calculation of temperatures using a HP 41 CV microcomputer, 8:54518 (RA;US)
Impact Tests
Drop test facility available to private industry, 8:54402 (RA;US)
Experimental impact and puncture evaluation of the prototype quarter scale TRU transport package, 8:54424 (RA;US)
Experimental and analytical program to evaluate packaging and target hardness as related to nuclear waste transportation systems, 8:54427 (RA;US)
Packaging test capabilities of the SNL aerial cable facility, 8:54422 (RA;US)
Test and analysis on impact characteristics evaluation of nuclear fuel packaging loaded on vehicle, 8:54393 (RA;US)
Information Systems
RAMPAC: a database of certified packaging for radioactive materials, 8:53546 (RA;US)
Inspection
Construction and inservice inspection rules for nuclear spent fuel and high-level waste transport packagings, 8:53568 (RA;US)
Licensing
Licensing experience in obtaining approval of Type B packaging, 8:53484 (RA;US)
Manufacturing
Guide to quality assurance measures for manufacturing and use of RAM packagings, 8:54452 (RA;US)
Materials Testing
Long-term performance of materials used for high-level waste packaging. Quarterly report, April-June 1983, 8:53656 (R;US)
Mechanical requirements for materials of accident proof packagings of radioactive materials, 8:54380 (RA;US)
Review of DOE waste package program. Subtask 1.1. National waste package program, October 1982-March 1983. Vol. 4, 8:53652 (R;US)
Mechanical Tests
Justification and advantages of crushing tests compared with fall tests and the modification of existing regulations, 8:54392 (RA;US)
Puncture protection for the TRUPACT system, 8:54389 (RA;US)
Performance Testing
Development of a large fire test facility for packaging thermal testing, 8:54443 (RA;US)
Packaging test facilities at Sandia National Laboratories, 8:54401 (RA;US)
Thermal analysis of packaging using the integral method, 8:53542 (RA;US)
Plastics
Thermal explosion hazard of thin layers of gelatine dynamite, 8:54790 (RA;US)
Quality Assurance
Discussion of Regulatory Guide 7.10, emphasizing the graded approach for establishing QA programs, 8:54453 (RA;US)
Guide to quality assurance measures for manufacturing and use of RAM packagings, 8:54452 (RA;US)
Quality assurance in packaging design through the peer review process, 8:54456 (RA;US)
Shock Absorbers
Invesigations on shock absorbers for Type B packagings, 8:54465 (RA;US)
Temperature Effects
Thermal analysis of packaging using the integral method, 8:53542 (RA;US)
Thermal Insulation
One dimensional foam thermal modeling of TRUPACT wall section, 8:54403 (RA;US)
Safety assessment and fire test on Type B packages of combustible thermal insulator for radioactive materials, 8:53485 (RA;US)
Three-Dimensional Calculations
Three-dimensional finite element analysis of radioactive material packagings, 8:54449 (RA;US)
Ultrasonic Welding
Thermal explosion hazard of thin layers of gelatine dynamite, 8:54790 (RA;US)

PACKED BED
Cryogenics
Experiment to determine properties of packed particle beds and regenerators at cryogenic temperatures, 8:54475 (R;US)

PAH
See POLYCYCLIC AROMATIC HYDROCARBONS

PAINTS
Spray Coating
Assessment of energy-efficiency improvements for paint spray booths, 8:54162 (R;US)

PAPER INDUSTRY
Energy Conservation
Innovative industrial-materials processes, 8:54175 (R;US)
Processing
Evaluation of hydropyrolysis as an energy-saving alternative to the Tomlinson furnace. Task III. Chemical causes of increased pulp yield, 8:54160 (R;US)
Spent Liquors
Evaluation of hydropyrolysis as an energy-saving alternative to the Tomlinson furnace. Task II. Chemistry of hydropyrolysis, 8:54161 (R;US)
Yields
Evaluation of hydropyrolysis as an energy-saving alternative to the Tomlinson furnace. Task III. Chemical causes of increased pulp yield, 8:54160 (R;US)

PARABANIC ACID
See ORGANIC OXYGEN COMPOUNDS

PARABOLIC TROUGH COLLECTORS
Design
Development of mass-producible line-focus tracking concentrating solar collectors - Category 1: collectors. Final report, 8:53819 (R;US)

PARAFFINS
See ALKANES

PARAMAGNETIC RESONANCE (NUCLEAR)
See NUCLEAR MAGNETIC RESONANCE

PARAMETRIC AMPLIFIERS
SQUID Devices
Demonstration of SQUID (superconducting quantum interference device) parametric amplifier. Annual report No. 1, 14 September 81-14 September 82, 8:54371 (R;US)

PARKS
See PUBLIC LANDS
RECREATIONAL AREAS

PARKS (ENERGY)
See ENERGY PARKS

PARTICLE BEAM FUSION ACCELERATOR
Ion Sources
Ampfion hybrid diodes on Hydramite and PBFA-I, 8:55297 (R;US)
Applied-B ion diode experiments on PBFA I, 8:55299 (R;US)
Diagnosing the ion beam on the Applied-B diode, 8:55300 (R;US)
Light-ion-beam fusion, 8:55305 (R;US)
Overview of ion-diode research, 8:55298 (R;US)
PARTICLE BEAMS
Beam Transport
Numerical simulation of the axisymmetric hollowing instability. Memorandum report, 8:54569 (R;US)
PARTICLE BOOSTERS
First stages of a multistage accelerator.
Beam Transport
BSF beam line, 8:54588 (R;JP)
PARTICLE IDENTIFICATION
Particle identification, 8:54711 (RA;US)
Magnetic Spectrometers
Large solid angle solenoid spectrometer with particle identification by dE/dx, 8:54723 (RA;US)
PARTICLE INTERACTIONS
See also HADRON-HADRON INTERACTIONS
Cross Sections
Cross section estimates for multi-TeV physics, 8:55151 (RA;US)
Magnetic Spectrometers
Organization of the RISK spectrometer electronic logic circuits on the base of the event preliminary selection unit, 8:54697 (R;SU;In Russian)
Multiple Production
Calorimetric physics in the presence of multiple events, 8:54729 (RA;US)
Particle Production
Cross section estimates for multi-TeV physics, 8:55151 (RA;US)
Research Programs
Workshop on SPS fixed-target phsics in the years 1984-1989. Vol. 1. Proceedings, 8:55133 (R;XC)
PARTICLE RESUSPENSION
Calculation Methods
Computation of radionuclide particulate finite area fugitive source strengths, 8:54899 (J;GB)
Time Dependence
Computation of radionuclide particulate finite area fugitive source strengths, 8:54899 (J;GB)
PARTICLE SIZE
Image Intensifiers
Image analysis of particle perimeters, 8:54242 (J;US)
Measuring Methods
Image analysis of particle perimeters, 8:54242 (J;US)
PARTICLE SIZE CLASSIFIERS
Design
Optically active biological particle-distinguishing apparatus, 8:54918 (P;US)
PARTICLE TRACKS
Image Processing
Generalized formulas for determining kinematic parameters of charged particle tracks with the account of total error matrix in factorized representation, 8:54694 (R;SU;In Russian)
PARTICLES
When appropriate use more specific terms listed under CHARGED PARTICLES, ELEMENTARY PARTICLES, and QUASI PARTICLES.
See also PARTICULATES
Monitoring
Apparatus and method for quantitative determination of materials contained in fluids, 8:54889 (P;US)
PARTICULATES
Prior to September 1981, this concept was indexed to PARTICLES and AEROSOLS.
Pollution Sources
Atlas of source emission particles, 8:54876 (R;US)
Radiation Monitoring
Strontium-90 and cesium-137 in air-borne dust; April, 1978 to September, 1978. Radioactivity survey related with environmental and dietary materials, 8:54875 (RA;JP)
Radioactivity
Strontium-90 and cesium-137 in air-borne dust; April, 1978 to September, 1978. Radioactivity survey related with environmental and dietary materials, 8:54875 (RA;JP)
Radionuclide Migration
Computation of radionuclide particulate finite area fugitive source strengths, 8:54899 (J;GB)
Levels of strontium 90 in the environment at PINSTECH (Period 1979-1980), 8:54927 (R;PK)
PASSIVE SOLAR HEATING SYSTEMS
See also TROMBE WALLS
Computerized Simulation
Simulation of a passive solar energy system. Master's thesis, 8:53799 (R;US)
Design
Modular roofing component for collecting solar radiation, 8:53814 (P;FR;In French)
Research Programs
North Carolina Energy Institute. Annual report, 1982, 8:54070 (R;US)
PATHFINDER REACTOR
Reactor Decommissioning
Residual radioactivity assessment in nuclear power plants: concentrations, distribution inventories, 8:54000 (RA;US)
PAVEMENTS
Recycling
Surface characteristics of roads resurfaced using the repave process. Final report, 8:54155 (R;US)
PBFA
See PARTICLE BEAM FUSION ACCELERATOR
PCB
See CHLORINATED AROMATIC HYDROCARBONS
PDX DEVICES
Microwave Amplifiers
ECRH transmission systems for PDX, PLT, TFTR and upgrades, 8:55275 (RA;US)
PEACH BOTTOM-2 REACTOR
Power Supplies
Technical-evaluation report on the monitoring of electric power to the reactor-protection system for the Peach Bottom Atomic Power Station Units 2 and 3 (Docket Nos. 50-277, 50-278, 8:53909 (R;US)
Reactor Protection Systems
Technical-evaluation report on the monitoring of electric power to the reactor-protection system for the Peach Bottom Atomic Power Station Units 2 and 3 (Docket Nos. 50-277, 50-278, 8:53909 (R;US)
PEACH BOTTOM-3 REACTOR
Power Supplies
Technical-evaluation report on the monitoring of electric power to the reactor-protection system for the Peach Bottom Atomic Power Station Units 2 and 3 (Docket Nos. 50-277, 50-278, 8:53909 (R;US)
Reactor Protection Systems
Technical-evaluation report on the monitoring of electric power to the reactor-protection system for the Peach Bottom Atomic Power Station Units 2 and 3 (Docket Nos. 50-277, 50-278, 8:53909 (R;US)
PEARL SPAR
See DOLOMITE
PEAT
Macerals
Premaceral contents of peats correlated with proximate and ultimate analysis, 8:53377 (J;US)
Research Programs
North Carolina Energy Institute. Annual report, 1982, 8:54070 (R;US)
PEATGAS PROCESS
Monitoring
Engineering-support services for the DOE/GRI coal-gasification research program. Monthly technical progress report, 27 February-26 March 1982, 8:53335 (R;US)
Pilot Plants
Engineering-support services for the DOE/GRI coal-gasification research program. Monthly technical progress report, 27 February-26 March 1982, 8:53335 (R;US)

PEBBLE BED REACTORS
See also AVR REACTOR
Neutron Flux
Detection of flux perturbations in pebble bed HTGRs by near core instrumentation, 8:53883 (R;XA)
Power Distribution
Detection of flux perturbations in pebble bed HTGRs by near core instrumentation, 8:53883 (R;XA)
Reactor Cores
Investigation of a high-temperature reactor with a central region of graphite-spheres, 8:53918 (R;DE;In German)
Reactor Instrumentation
Core-adjacent instrumentation systems for pebble bed reactors for process heat application - state of planning, 8:53886 (R;XA)
Reactor Kinetics
Investigation of a high-temperature reactor with a central region of graphite-spheres, 8:53918 (R;DE;In German)
PENNING ION SOURCES
Heavy Ions
Ion source of the accelerator for heavy ion fusion, 8:54607 (RA;JP)
PENTAERYTHRITOL TETRANITRATE
See PETN
PEOPLE
See HUMAN POPULATIONS
PEOPLES REPUBLIC OF CHINA
See CHINA
PEP STORAGE RINGS
Data Acquisition Systems
SLAC M TAC M SHAM Auxiliary Backplane No. 2 (Engineering Materials), 8:54600 (E;US)
Monitors
SLAC analog status monitor Mod II (Engineering Materials), 8:54635 (E;US)
Radiation Detectors
SLAC M TAC M SHAM Auxiliary Backplane No. 2 (Engineering Materials), 8:54600 (E;US)
Trigger Circuits
SLAC trigger distribution detector/transmitter: DL-208-503-00-R1 Drawing List (Engineering Materials), 8:54636 (E;US)
PEPTIDE HORMONES
Iodination
Development of the kits for RIA simultaneous determination of polypeptide hormones. Final report for the period 15 March 1980 - 14 December 1982, 8:54973 (R;XA)
Radioimmunoassay
Development of the kits for RIA simultaneous determination of polypeptide hormones. Final report for the period 15 March 1980 - 14 December 1982, 8:54973 (R;XA)
PEPTIDES
Molecular Structure
Isolation of an active site peptide from spinach ribulose bisphosphate carboxylase/oxygenase modified by glyoxylate, 8:54962 (R;US)
Structural Chemical Analysis
Chromopeptides from phycoerythrins. Structure and linkage of a phycoerythrobilin tryptic tripeptide derived from a B-phycoerythrin, 8:54328 (J;US)
PERMANENT MAGNETS
Design
Conceptual design of a permanent quadrupole magnet with adjustable strength, 8:54625 (J;NL)
Permanent-magnet multipole with adjustable strength, 8:54629 (P;US)
Multipoles
Permanent-magnet multipole with adjustable strength, 8:54629 (P;US)
PERMITTIVITY
One-Dimensional Calculations
Effects of dissipation in one-dimensional inverse problems, 8:55223 (R;US)
PERSONNEL
Studies of groups of persons employed in a particular field of endeavor. For studies on individuals in a group see also MAN.
See also MINERS
REACTOR OPERATORS
Education
Program for developing professional capabilities in energy-conservation policy analysis. Final report, September 1979-December 1980, 8:54054 (R;US)
Health Hazards
Aerosols from metal cutting techniques typical of decommissioning nuclear facilities - inhalation hazards and worker protection, 8:53690 (RA;US)
Aerosols from metal cutting techniques typical of decommissioning nuclear facilities - experimental system for collection and characterization, 8:53691 (RA;US)
Mortality
Cancer mortality at a naval nuclear shipyard, 8:55010 (RA;US)
DOE health and mortality study at Oak Ridge, 8:55009 (RA;US)
Lung cancer among workers at a uranium processing plant, 8:55029 (RA;US)
Mortality among workers at the Oak Ridge National Laboratory, 8:55008 (RA;US)
Mortality among plutonium and other workers at a nuclear facility, 8:55027 (RA;US)
Mortality patterns among a retrospective cohort of uranium mill workers, 8:55031 (RA;US)
Occupational Safety
Effects of added resistance to breathing in obstructed lung disease. Phase 1, 8:54975 (R;US)
Radiation Doses
Critical evaluation of the results given by the INTERTRAN code: an example of parametric analysis to study the influence of the various components on the final result, 8:53490 (RA;US)
Development of a model for the assessment of radiation dose received by workers in the transport of radioactive materials, 8:53702 (RA;US)
Potential problems from shipment of high-curie content contact-handled transuranic (CH-TRU) waste to WIPP, 8:53580 (R;US)
Radiation exposure resulting from the transport of radioactive materials within the United Kingdom, 8:53701 (RA;US)
Statistical data on the transport of radioactive materials in Italy and radiation dose evaluation to transport workers, 8:53703 (RA;US)
Study of the exposures received by the persons involved in the transportation of radioactive materials, 8:53700 (RA;US)
Worlwide risk assessment on the transportation of radioactive materials, 8:53489 (RA;US)
Radiation Hazards
Proposed UK legislation to provide radiological protection for workers, with emphasis on its application to the transport of radioactive materials, 8:53511 (RA;US)
Some design considerations for cask handling at large-scale shipping and receiving facilities, 8:53713 (R;US)
Training
Compliance training, 8:53574 (RA;US)
Problems of the educational training: quality and quantity of the workers involved in the transport of radioactive materials, 8:53573 (RA;US)
Program for developing professional capabilities in energy-conservation policy analysis. Final report, September 1979-December 1980, 8:54054 (R;US)
PERSONNEL DOSIMETRY
Errors
Considerations in using radiation dosimetry data in epidemiologic studies, 8:55018 (RA;US)
Evaluation
Improvement in radiation exposure measurements at Rocky Flats over the past 30 years and its possible impact on epidemiological studies, 8:54922 (RA;US)
Thermoluminescent Dosemeters
Calculation of the neutron sensitivity of thermoluminescent detectors. 1. Fundamentals, 8:54738 (R;DD;In German)
PERSONNEL FILM DOSIMETRY
See PERSONNEL DOSIMETRY

PESTICIDES
Environmental Transport
Agrochemicals: fate in food and the environment. Proceedings of an international symposium on agrochemicals: fate in food and the environment using isotope techniques, jointly organized by the IAEA and the FAO and held in Rome, 7-11 June 1982, 8:54997 (B;XA;FR)
PETN
Detonations
Detonation properties of condensed explosives calculated with an equation of state based on intermolecular potentials, 8:54838 (RA;US)
Development of a single species equation of state for detonation products suitable for hydrocode calculations, 8:54840 (RA;US)
Shock initiation in gap test configurations, 8:54808 (RA;US)
Two-phase visco-plastic model of shock initiation of detonation in high density pressed explosives, 8:54820 (RA;US)
Void collapse model for shock initiation, 8:54823 (RA;US)
Polymers
Effect of polymers on the drop-weight sensitiveness of explosives, 8:54788 (RA;US)
Sensitivity
Effect of polymers on the drop-weight sensitiveness of explosives, 8:54788 (RA;US)
Shock initiation in gap test configurations, 8:54808 (RA;US)
PETROCHEMICAL FEEDSTOCKS
See CHEMICAL FEEDSTOCKS
PETROLEUM
Limited to crude oil; see also COAL LIQUIDS, SHALE OIL, etc.
Chemical Analysis
Development of an improved method for the analysis of pressure-core samples. Final report, 8:53432 (R;US)
Global Aspects
Global aspects of energy supply and demand, 8:54079 (RA;US)
Production
Improved secondary oil recovery by controlled waterflooding-pilot demonstration: Ranger Zone, Fault Block VII, Wilmington Field. Phase IV. Quarterly report, April-June 1983, 8:53433 (R;US)
Resources
Toward an estimate of world heavy crude oil and tar sands resources, 8:53449 (RA;US)
Solvent Properties
Cooperative investigation by Auburn University and Cities Service Research and Development Company of combined coal and heavy-resid processing. Quarterly report, January 15, 1983-April 15, 1983, 8:53345 (R;US)
Supply Disruption
Strategic Petroleum Reserve and Hawaii, 8:54091 (RA;US)
PETROLEUM COKE
See PETROLEUM PRODUCTS
PETROLEUM DEPOSITS
Leases
Diapir Field lease offering, June 1984, 8:53440 (R;US)
Resources
Tars and heavy crude in Texas, 8:53451 (RA;US)
PETROLEUM INDUSTRY
Energy Conservation
Innovative industrial-materials processes, 8:54175 (R;US)
Federal Republic of Germany
VEBA-report on activities in 1980, 8:55326 (R;DE;In German)
PETROLEUM PRODUCTS
See also GASOLINE
KEROSENE
Market
Petroleum marketing monthly (Contains glossary), 8:54058 (R;US)
PETROLEUM REFINERIES
Aerosol Monitoring
Characterization of polynuclear aromatic compounds in petroleum-refining localities. Progress report, September 1, 1982-November 30, 1983, 8:54880 (R;US)
Air Pollution
Ambient hydrocarbon and ozone concentrations near a refinery. Final report, 8:54885 (R;US)
Characterization of polynuclear aromatic compounds in petroleum-refining localities. Progress report, September 1, 1982-November 30, 1983, 8:54880 (R;US)
Environmental Effects
Potential damage of oil wastes in coastal estuary sediments, 8:53441 (R;US)
PETROLEUM RESIDUES
B.P. over 1100°F, 593°C; includes oil residues, residua.
Oil Saturation
Assessment of gamma-inject logging techniques for the determination of residual oil saturation. Final report (Natural gamma background is first logged then radioactive fluids are injected into depleted reservoirs and the gamma signal returning to the borehole is measured), 8:53431 (R;US)
Solvent Properties
Cooperative investigation by Auburn University and Cities Service Research and Development Company of combined coal and heavy-resid processing. Quarterly report, January 15, 1983-April 15, 1983, 8:53345 (R;US)
PETROLEUM STOCKS
See INVENTORIES
PHASE TRANSFORMATIONS
See also MELTING
SOLIDIFICATION
Some aspects of the computer simulation of conduction heat transfer and phase change processes, 8:54045 (BA;US)
PHENOL
Gas Chromatography
Identification and separation of the organic compounds in coal-gasification condensate waters, 8:53371 (R;US)
Liquid Column Chromatography
Identification and separation of the organic compounds in coal-gasification condensate waters, 8:53371 (R;US)
Mass Spectroscopy
Identification and separation of the organic compounds in coal-gasification condensate waters, 8:53371 (R;US)
PHENOLS
See also NAPHTHOLS
PHENOL
Chemical Reactions
Rate constants for the decay and reactions of the lowest electronically excited singlet state of molecular oxygen in solution, 8:54343 (J;US)
Regiospecific incorporation of bromine and iodine into phenols using (trimethylsilyl)phenol derivatives, 8:54333 (J;US)
Chromatography
Application of Kelgraph to electrochemical detectors for flow injection analysis and high performance liquid chromatography. Technical report, 8:54299 (R;US)
NMR Spectra
Cross polarization and magic angle sample spinning NMR spectra of model organic compounds. 1. Highly protonated molecules, 8:54334 (J;US)
Quantitative Chemical Analysis
Application of Kelgraph to electrochemical detectors for flow injection analysis and high performance liquid chromatography. Technical report, 8:54299 (R;US)
Spin-Lattice Relaxation
Cross polarization and magic angle sample spinning NMR spectra of model organic compounds. 1. Highly protonated molecules, 8:54334 (J;US)
Waste Processing
Treatment of phenol with an innovative fluidized bed activated carbon anaerobic filter, 8:54940 (R;US)
PHENYLCARBINOL
See BENZYL ALCOHOL
PHOSPHATE GLASS
Ion Implantation
Alkali depletion and ion-beam mixing in glasses, 8:54281 (R;US)
PHOSPHONIC ACID ESTERS
Structural Chemical Analysis
Nuclear magnetic resonance study of ethylenediaminetetrakis(methylenephosphonic acid) and some metal complexes, 8:54332 (J;US)

PHOSPHORS
Response Functions
Measurement of the response of an SCG1-C scintillation glass shower detector to 2-17.5 GeV positrons, 8:54719 (RA;US)
PHOSPHORUS
Activation Analysis
Elemental composition of human and animal milk. A review. A report prepared under the auspices of the IAEA in collaboration with the WHO, 8:54983 (R;XA)
PHOSPHORUS 32
Body Burden
Body burden estimation of ^{32}P by measurement and calibration of bremsstrahlung radiation produced in the skull, 8:55050 (J;GB)
Ingestion
Body burden estimation of ^{32}P by measurement and calibration of bremsstrahlung radiation produced in the skull, 8:55050 (J;GB)
PHOTODISINTEGRATION
See PHOTONUCLEAR REACTIONS
PHOTOELECTROCHEMICAL CELLS
Design
Development of a solar-energy system. First annual report, 8:53770 (R;US)
Semiconductor liquid-junction solar cell, 8:53786 (P;US)
Solar Concentrators
Semiconductor liquid-junction solar cell, 8:53786 (P;US)
PHOTOGRAPHIC FILMS
Developers
Reversal film development for streamer chamber track photographs, 8:54702 (R;SU)
PHOTOGRAPHS
See IMAGES
PHOTOMAGNETOELECTRIC EFFECT
See MAGNETIC FIELDS
PHOTON DETECTION (GAMMA)
See GAMMA DETECTION
PHOTON DETECTION (X-RAY)
See X-RAY DETECTION
PHOTON TRANSPORT
Computerized Simulation
Capabilities of the BRAND program complex for simulating the neutron-physical experiments by the Monte-Calo method, 8:53914 (R;SU;In Russian)
Mathematical Models
Particle transfer in multiregion, 8:55204 (R;XA)
PHOTONEUTRONS
Tissues
Energy spectra of secondary neutrons produced by high energy bremsstrahlung in carbon, nitrogen, oxygen and tissue, 8:55207 (RA;AU)
PHOTON-PROTON INTERACTIONS
Photoproduction
High-energy photoproduction of states containing heavy quarks and other rare phenomena, 8:55137 (R;US)
PHOTONUCLEAR REACTIONS
Radiation Doses
Dose contribution due to photonuclear reactions during radiotherapy, 8:54998 (R;AU)
Dose due to photonuclear reactions in tissue during radiotherapy with high energy gamma rays, 8:55001 (RA;AU)
PHOTOSYNTHESIS
Biomimetic Processes
Solar production of hydrogen. A biological approach, 8:53736 (J;US)
Electron Transfer
Effects of continuous-background irradiance on xenon-flash-induced fluorescence yields in marine microalgae, 8:54967 (R;US)
Electron transfer around photosystem I in cyanobacterial heterocyst membranes, 8:54966 (R;US)
PHOTOSYNTHETIC BACTERIA
Electrolysis
Anion radicals of bacteriochlorophylls c, d, and e. Likely electron acceptors in the primary photochemistry of green and brown photosynthetic bacteria, 8:54339 (J;US)
PHOTOSYNTHETIC REACTION CENTERS
Biochemical Reaction Kinetics
Effects of continuous-background irradiance on xenon-flash-induced fluorescence yields in marine microalgae, 8:54967 (R;US)
PHOTOTRANSISTORS
Physical Radiation Effects
Total-dose radiation-effects data for semiconductor devices. Vol. 1, 8:54759 (R;US)
PHOTOVOLTAIC POWER PLANTS
Environmental Impacts
Health and environmental effects document for photovoltaic energy systems, 1982, 8:53788 (R;US)
Health Hazards
Health and environmental effects document for photovoltaic energy systems, 1982, 8:53788 (R;US)
Performance
Solar-photovoltaic energy system for the G.N. Wilcox Memorial Hospital and Health Care Center, 8:53789 (RA;US)
Risk Assessment
Health and environmental effects document for photovoltaic energy systems, 1982, 8:53788 (R;US)
PHOTOVOLTAIC POWER SUPPLIES
Photovoltaic conversion of solar energy, 8:53780 (R;US)
Construction
Development and evaluation of solar-photovoltaic systems. Final report, 8:53790 (R;US)
Design
Development and evaluation of solar-photovoltaic systems. Final report, 8:53790 (R;US)
Economic Analysis
Effects of future energy scenarios on photovoltaic energy value, 8:53761 (R;US)
Environmental Impacts
Health and environmental effects document for photovoltaic energy systems, 1982, 8:53788 (R;US)
Field Tests
Development and evaluation of solar-photovoltaic systems. Final report, 8:53790 (R;US)
Forecasting
Effects of future energy scenarios on photovoltaic energy value, 8:53761 (R;US)
Health Hazards
Health and environmental effects document for photovoltaic energy systems, 1982, 8:53788 (R;US)
Risk Assessment
Health and environmental effects document for photovoltaic energy systems, 1982, 8:53788 (R;US)
PHTHALATES
Gas Chromatography
Kinds and quantities of organic combustion products in solid and liquid wastes from a coal-fired power station, 8:53393 (R;US)
Mass Spectroscopy
Kinds and quantities of organic combustion products in solid and liquid wastes from a coal-fired power station, 8:53393 (R;US)
PHYSICAL PROTECTION DEVICES
Foams
Stabilized aqueous foam systems, concentrate for producing a stabilized aqueous foam and method of producing said foam, 8:53723 (P;US)
PHYTOCHROMES
See also CHLOROPHYLL
Bioassay
Phytochrome from green plants: assay, purification, and characterization, 8:54963 (R;US)
Chemical Analysis
Phytochrome from green plants: assay, purification, and characterization, 8:54963 (R;US)
PIEZOMETRY
Probes
Piezometer-probe technology for geotechnical investigations in coastal and deep-ocean environments, 8:54769 (R;US)

PIG ION SOURCES
See PENNING ION SOURCES
PIGE ANALYSIS
See PROTON REACTIONS
PIGMENT CELLS
See ANIMAL CELLS
PINES
Fertilizers
Uptake of ^{15}N labelled urea and ammonium nitrate by 4-year old Douglas-fir grown in sand-peat mix, 8:54986 (RA;XA)
PINS (FUEL)
See FUEL PINS
PION DETECTION
Cherenkov Counters
Cedar counters for particle identification in the SPS secondary beams: A description and an operation manual, 8:54672 (R;XC)
Installation for studying pion radiative scattering on nuclei, 8:54683 (R;SU;In Russian)
Scintillation Counters
Installation for studying pion radiative scattering on nuclei, 8:54683 (R;SU;In Russian)
Shower Counters
Test of a flash chamber calorimeter as a nucleon decay detector, 8:54657 (RA;US)
PION MINUS REACTIONS
Capture
Study on the pion absorption by atomic nuclei by means of multilayer semiconductor spectrometer, 8:55188 (R;SU;In Russian)
On-Line Measurement Systems
Installation for studying pion radiative scattering on nuclei, 8:54683 (R;SU;In Russian)
Particle Production
Analysis of hadron jet behaviour in πpC interactions at 40 GeV/c, 8:55173 (R;SU;In Russian)
Characteristics of secondary neutrons in the $\pi^- p$, $\pi^- n$, π^- ^{12}C interactions at P--40 GeV/c, 8:55174 (R;SU;In Russian)
Correlation effects in multiple particle production on nuclei in the cumulative region, 8:55169 (R;SU)
Neutral pion production in pion-xenon nucleus collisions at 3.5 GeV/c momentum, 8:55185 (R;SU)
PION MINUS-NEUTRON INTERACTIONS
Particle Production
Characteristics of secondary neutrons in the $\pi^- p$, $\pi^- n$, π^- ^{12}C interactions at P--40 GeV/c, 8:55174 (R;SU;In Russian)
PION MINUS-PROTON INTERACTIONS
On-Line Measurement Systems
Apparatus for measuring the polarization in charge-exchange reactions, 8:54680 (R;SU;In Russian)
Particle Production
Characteristics of secondary neutrons in the $\pi^- p$, $\pi^- n$, π^- ^{12}C interactions at P--40 GeV/c, 8:55174 (R;SU;In Russian)
PION PLUS REACTIONS
Knock-Out Reactions
Detection of inverse electroproduction of pions on ^{7}Li nuclei, 8:55172 (R;SU;In Russian)
PION REACTIONS
See also PION MINUS REACTIONS
PION PLUS REACTIONS
Charge-Exchange Reactions
Study of isovector resonances with pion charge exchange, 8:55177 (J;NL)
Quasi-Elastic Scattering
Study of the incident pion deflection in passing through atomic nucleus, 8:55184 (R;SU)
PION-NUCLEON INTERACTIONS
Study on the pion absorption by atomic nuclei by means of multilayer semiconductor spectrometer, 8:55188 (R;SU;In Russian)
PIONS
See also PIONS MINUS
PIONS NEUTRAL
Particle Production
Correlation effects in multiple particle production on nuclei in the cumulative region, 8:55169 (R;SU)
PIONS MINUS
Spectroscopy
Installation for studying pion radiative scattering on nuclei, 8:54683 (R;SU;In Russian)
PIONS NEUTRAL
Multiplicity
Neutral pion production in pion-xenon nucleus collisions at 3.5 GeV/c momentum, 8:55185 (R;SU)
Particle Production
Neutral pion production in pion-xenon nucleus collisions at 3.5 GeV/c momentum, 8:55185 (R;SU)
PIPELINES
Construction
Great Plains Gasification Associates. Quarterly technical and environmental report, Great Plains coal gasification project, Mercer County, North Dakota, second quarter, 1983, 8:53336 (R;US)
Design
Design calculations for a gas pipeline for the transport of solar-produced hydrogen over large distances taking non-stationary operating conditions into account, 8:53737 (TG;US)
Great Plains Gasification Associates. Quarterly technical and environmental report, Great Plains coal gasification project, Mercer County, North Dakota, second quarter, 1983, 8:53336 (R;US)
Engineering
Great Plains Gasification Associates. Quarterly technical and environmental report, Great Plains coal gasification project, Mercer County, North Dakota, second quarter, 1983, 8:53336 (R;US)
PIPES
Corrosion
Corrosion evaluation of stove pipe materials and surface treatments. Final report, 8:54126 (R;US)
Materials Testing
Corrosion response of downhole steam generator assembly and instrumentation and supply line tubings at Long Beach field test, 8:53434 (R;US)
PITTSBURGH OXYDESULFURIZATION PROCESS
Chemical Reaction Kinetics
Effect of pH on the removal of pyritic sulfur from coal by oxydesulfurization, 8:53416 (RA;US)
Kinetics of organic sulfur removal from coal by oxydesulfurization, 8:53417 (RA;US)
Parametric Analysis
Oxydesulfurization of coal. Final report, 8:53414 (R;US)
Particle size effects in oxidation of pyrite in air/water chemical coal cleaning, 8:53415 (RA;US)
Particle Size
Particle size effects in oxidation of pyrite in air/water chemical coal cleaning, 8:53415 (RA;US)
PH Value
Effect of pH on the removal of pyritic sulfur from coal by oxydesulfurization, 8:53416 (RA;US)
PITTSBURG-MIDWAY SOLVENT REFINED COAL PRO
See SRC PROCESS
PLAGES
X Radiation
Studies of solar Ca K plages and UV, X-ray and 10 cm variations. Technical memo, 8:55096 (R;US)
PLANETARY MAGNETOSPHERES
Whistlers
Chorus-related electrostatic bursts at Jupiter and Saturn. Progress report, 8:55091 (R;US)
Ion cyclotron waves in the Io plasma torus: polarization reversal of whistler mode noise. Revision. Progess report, 8:55090 (R;US)
PLANT DISEASES
Research Programs
Plant physiological isotope aided studies specific to rubber trees, 8:54992 (RA;XA)
PLANTS
See also CITRUS
GRAMINEAE
LEGUMINOSAE
NICOTIANA

TREES
Decomposition
The analytical pyrolysis of particulate residues of decomposing Myriophyllum heterophyllum, 8:54937 (J;NL)
Radionuclide Kinetics
Radionuclide concentrations in vegetation at a solid radioactive waste-disposal area in southeastern Idaho, 8:54932 (J;US)
PLANTS (INDUSTRIAL)
See INDUSTRIAL PLANTS
PLASMA
See also LASER-PRODUCED PLASMA
Correlation Functions
Charge-charge correlation functions in ultra dense plasmas. Memorandum report, 8:55235 (R;US)
Magnetic Field Configurations
Fast reconnection of magnetic fields in a plasma, 8:55287 (R;US)
PLASMA ACCELERATION
Plasma sweeper (Patents), 8:55253 (P;US)
PLASMA CONFINEMENT
See also INERTIAL CONFINEMENT
Plasma physics. Report on the 1982 international conference, Goeteborg, Sweden, 9-15 June 1982, 8:55252 (J;AT)
PLASMA DIAGNOSTICS
Alpha Detection
Technical progress report on the TFTR alpha extraction and measurement project, 8:55242 (R;US)
Emission Spectra
Dielectronic satellite spectra of hydrogen-like titanium (Ti XXII), 8:55246 (R;US)
PLASMA MACROINSTABILITIES
Energy Spectra
Spectrum of resistive MHD modes in cylindrical plasmas, 8:55245 (R;US)
PLASMA OSCILLATIONS
See PLASMA WAVES
PLASMA (QUARK)
See QUARK MATTER
PLASMA SWITCHES
Gases
Electron-drift velocity and ionization and attachment coefficients in gases/mixtures for diffuse-discharge opening switches, 8:54550 (R;US)
PLASMA WAVES
Backscattering
Stimulated Brillouin backscatter in long scale length plasmas. Memorandum report, 8:55258 (R;US)
PLASTIC SCINTILLATION COUNTERS
See PLASTIC SCINTILLATION DETECTORS
PLASTIC SCINTILLATION DETECTORS
Efficiency
Increasing uniformity of light collection in extended scintillation counters by means of spectral shift of scintillator emission, 8:54681 (R;SU;In Russian)
Neutron Spectroscopy
Application of the plastic scintillator counter for measuring the high-energy neutron spectra, 8:54700 (R;SU;In Russian)
PLASTICS
See also POLYSTYRENE
POLYURETHANES
TEFLON
THERMOPLASTICS
Service Life
Durability of marker materials for nuclear waste isolation sites, 8:53670 (R;US)
Surface Coating
Electroless metal plating of plastics, 8:54244 (P;US)
PLATES
Thicker than SHEETS or FOILS.
Acceleration
Acceleration of two metal plates in an He-metal sandwich, 8:54848 (RA;US)
Planar flyer plate driven by detonation product convergent flow, 8:54849 (RA;US)
PLATES (FUEL)
See FUEL PLATES
PLATINUM
Catalytic Effects
Kinetics of hydrogen production from methyl viologen radicals on colloidal platinum, 8:53735 (J;US)
Photoassisted reduction of sulfur dioxide in nonaqueous solutions at p-type semiconductor electrodes, 8:54313 (J;US)
PLATINUM ALLOYS
See also PLATINUM BASE ALLOYS
Thermal Shock
Thermal-shock resistant alumina-metal cermet insulators, 8:54261 (J;US)
PLATINUM BASE ALLOYS
Precipitation Hardening
HVEM in-situ studies of precipitate coarsening and dissolution in a Pt-C alloy (0.08 at.% C), 8:54226 (RA;US)
PLESIOTHERAPY
See RADIOTHERAPY
PLT DEVICES
Emission Spectra
Dielectronic satellite spectra of hydrogen-like titanium (Ti XXII), 8:55246 (R;US)
Microwave Amplifiers
ECRH transmission systems for PDX, PLT, TFTR and upgrades, 8:55275 (RA;US)
Plasma Diagnostics
Dielectronic satellite spectra of hydrogen-like titanium (Ti XXII), 8:55246 (R;US)
PLUTONIUM
Biogeochemistry
Ecological Research Division Marine Research Program, 8:54951 (R;US)
Electrorefining
Pyrochemical process for extracting plutonium from an electrolyte salt, 8:54243 (P;US)
Lung Clearance
Dissolution characteristics of Pu-contaminated soils and sediments in lung serum simulant solution, 8:55063 (J;GB)
Packaging
Packaging of plutonium and high-enriched uranium safeguards samples for transport (Quartz vials and sealed canisters), 8:53524 (RA;US)
Special requirements for shipping plutonium, 8:53514 (RA;US)
Radiochemical Analysis
Rapid method for the determination of americium-curium, plutonium and thorium in biological and environmental samples, 8:54349 (J;GB)
Recovery
Pyrochemical process for extracting plutonium from an electrolyte salt, 8:54243 (P;US)
Solubility
Dissolution characteristics of Pu-contaminated soils and sediments in lung serum simulant solution, 8:55063 (J;GB)
Toxicity
Assessment of plutonium internal contamination in man, 8:55041 (R;XE)
Transport Regulations
Special requirements for shipping plutonium, 8:53514 (RA;US)
PLUTONIUM 238
Lung Clearance
Fragmentation of inhaled $^{238}PuO_2$ particles in lung, 8:55054 (J;GB)
Radioecological Concentration
Plutonium contents and fluxes in a soybean crop ecosystem near a nuclear fuel chemical separations facility, 8:54931 (J;US)
Radionuclide concentrations in vegetation at a solid radioactive waste-disposal area in southeastern Idaho, 8:54932 (J;US)
Retention
Fragmentation of inhaled $^{238}PuO_2$ particles in lung, 8:55054 (J;GB)
Retention of inhaled $^{238}PuO_2$ in Beagles: a mechanistic approach to description, 8:55058 (J;GB)
Tissue Distribution
Retention of inhaled $^{238}PuO_2$ in Beagles: a mechanistic approach to description, 8:55058 (J;GB)

PLUTONIUM 239
Radioecological Concentration
Plutonium contents and fluxes in a soybean crop ecosystem near a nuclear fuel chemical separations facility, 8:54931 (J;US)
Plutonium and americium export to the north-east Pacific Ocean by Columbia River runoff, 8:54954 (J;GB)
Radionuclide concentrations in vegetation at a solid radioactive waste-disposal area in southeastern Idaho, 8:54932 (J;US)
The relative importance of uptake and surface adherence in determining the radionuclide contents of subterranean crops, 8:54929 (J;GB)
PLUTONIUM 240
Radioecological Concentration
Plutonium contents and fluxes in a soybean crop ecosystem near a nuclear fuel chemical separations facility, 8:54931 (J;US)
Radionuclide concentrations in vegetation at a solid radioactive waste-disposal area in southeastern Idaho, 8:54932 (J;US)
The relative importance of uptake and surface adherence in determining the radionuclide contents of subterranean crops, 8:54929 (J;GB)
PLUTONIUM COMPLEXES
Structural Chemical Analysis
Raman spectrometric studies of actinide(V) and -(VI) complexes in aqueous sodium carbonate solution and of solid sodium actinide(V) carbonate compounds, 8:54350 (J;US)
PLUTONIUM DIOXIDE
Containers
Design and testing of a plutonium oxide transport container, 8:54395 (RA;US)
Fragmentation
Fragmentation of inhaled $^{238}PuO_2$ particles in lung, 8:55054 (J;GB)
Inhalation
Fragmentation of inhaled $^{238}PuO_2$ particles in lung, 8:55054 (J;GB)
PLUTONIUM OXIDES
See also PLUTONIUM DIOXIDE
Retention
Retention of inhaled $^{238}PuO_2$ in Beagles: a mechanistic approach to description, 8:55058 (J;GB)
Tissue Distribution
Retention of inhaled $^{238}PuO_2$ in Beagles: a mechanistic approach to description, 8:55058 (J;GB)
PNA
See POLYCYCLIC AROMATIC HYDROCARBONS
PNEUMOCONIOSES
Diagnosis
Image analysis of chest radiographs. Final report, 8:54976 (R;US)
POCKELS CELL
Pulse Generators
Low-jitter, hydrogen thyratron Pockels cell driver, 8:55309 (R;US)
POINT POLLUTANT SOURCES
Used for general articles when sources are not named.
Pollution Regulations
Development document for effluent limitations guidelines and standards for the battery manufacturing point source category, 8:54958 (R;US)
POISONS (CHEMICAL)
See HAZARDOUS MATERIALS
POLAR COMPOUNDS
Gas Chromatography
Identification and separation of the organic compounds in coal-gasification condensate waters (5,5 dimethyl hydantoin, dihydroxy benzenes, acetonitrile), 8:53371 (R;US)
Liquid Column Chromatography
Identification and separation of the organic compounds in coal-gasification condensate waters (5,5 dimethyl hydantoin, dihydroxy benzenes, acetonitrile), 8:53371 (R;US)
System for analyzing coal-liquefaction products, 8:53382 (P;US)
Mass Spectroscopy
Identification and separation of the organic compounds in coal-gasification condensate waters (5,5 dimethyl hydantoin, dihydroxy benzenes, acetonitrile), 8:53371 (R;US)
POLARIZED BEAMS
Depolarization
Note on depolarizing resonances in the KEK 12 GeV synchrotron, 8:54590 (R;JP)
POLICY
See ENERGY POLICY
ENVIRONMENTAL POLICY
GOVERNMENT POLICIES
POLLUTANTS
Not for radioactive contaminants for which use RADIOACTIVE WASTES or other related terminology.
Ecological Concentration
Source reconciliation of atmospheric aerosols, 8:54891 (J;NL)
POLLUTION REGULATIONS
Regulations for nonradioactive pollution only; see also CONTAMINATION REGULATIONS.
Economic Impact
Buying a better environment: cost-effective regulation through permit trading. Technical report, 8:54061 (R;US)
POLOIDAL DIVERTOR EXPERIMENT
See PDX DEVICES
POLONIUM 210
Radioecological Concentration
Dating of lake sediments by determination of the polonium-210 (lead-210) content, 8:55083 (R;AT;In German)
POLYCYCLIC AROMATIC HYDROCARBONS
Gas Chromatography
Characterization of polynuclear aromatic compounds in petroleum-refining localities. Progress report, September 1, 1982-November 30, 1983, 8:54880 (R;US)
Kinds and quantities of organic combustion products in solid and liquid wastes from a coal-fired power station, 8:53393 (R;US)
Liquid Column Chromatography
Characterization of polynuclear aromatic compounds in petroleum-refining localities. Progress report, September 1, 1982-November 30, 1983, 8:54880 (R;US)
Mass Spectroscopy
Kinds and quantities of organic combustion products in solid and liquid wastes from a coal-fired power station, 8:53393 (R;US)
Mutagen Screening
Identification of mutagenic constituents in coal combustion fly ash, 8:53428 (R;US)
Quantitative Chemical Analysis
Identification of mutagenic constituents in coal combustion fly ash, 8:53428 (R;US)
POLYETHERS
See POLYETHYLENE GLYCOLS
POLYETHYLENE GLYCOLS
Hydrogenation
Ionic hydrogen bond. 2. Intramolecular and partial bonds. Protonation of polyethers, crown ethers, and diketones, 8:54321 (J;US)
Ionic hydrogen bond. 3. Multiple NH^+...O and CH/sup δ/$^+$...O bonds. Complexes of ammonium ions with polyethers and crown ethers, 8:54322 (J;US)
Structural Chemical Analysis
Ionic hydrogen bond. 2. Intramolecular and partial bonds. Protonation of polyethers, crown ethers, and diketones, 8:54321 (J;US)
Ionic hydrogen bond. 3. Multiple NH^+...O and CH/sup δ/$^+$...O bonds. Complexes of ammonium ions with polyethers and crown ethers, 8:54322 (J;US)
POLYETHYLENE OXIDES
See POLYETHYLENE GLYCOLS
POLYETHYLENES
Mass Spectroscopy
Direct mass-spectrometric studies of the pyrolysis of carbonaceous fuels. II. Qualitative observations of primary and secondary processes in biomass, 8:53783 (J;NL)

Pyrolysis
Direct mass-spectrometric studies of the pyrolysis of carbonaceous fuels. II. Qualitative observations of primary and secondary processes in biomass, 8:53783 (J;NL)

POLYMERS
See also ELASTOMERS
Crystal Structure
Annual progress report 1981-1982, 8:54268 (R;FR;In French)
Diffusion Coatings
Method of forming graded polymeric coatings or films, 8:53724 (P;US)
Mechanical Properties
Effect of polymers on the drop-weight sensitiveness of explosives, 8:54788 (RA;US)
Physical Radiation Effects
Radiation stability of plastics and rubbers, 8:54267 (R;GB)

POLYNUCLEAR AROMATIC HYDROCARBONS
See POLYCYCLIC AROMATIC HYDROCARBONS

POLYSTYRENE
Chromatography
Effects of porosity and surface area of octadecyl-derivatized silica on fractionations of oligomers of 800 MW polystyrene, 8:54336 (J;US)

POLYSULFIDES
See SULFIDES

POLYTHENE
See POLYETHYLENES

POLYTHIONIC ACIDS
See INORGANIC ACIDS

POLYURETHANES
Impact Shock
Shock response of flexible polyurethane foams, 8:54470 (RA;US)
Temperature Effects
Thermal testing in support of the TRUPACK development program, 8:53544 (RA;US)

POPULATION DENSITY
Analysis of population densities along transportation routes, 8:53487 (RA;US)

POPULATION RELOCATION
Algorithms
IDA/BPT crisis relocation planning model: description, documentation and user's guide to the computer program. Final report, 8:55345 (R;US)

PORK
See MEAT

POROUS MATERIALS
Compacting
Compaction of porous beds of inert materials, 8:54851 (RA;US)
Heat Transfer
Construction and verification of a finite-element method for nonisothermal flows in porous media, 8:54524 (R;US)
Knudsen Flow
Using diffusion measurements to determine pore-size distributions in porous materials, 8:54528 (J;GB)
Mass Transfer
Construction and verification of a finite-element method for nonisothermal flows in porous media, 8:54524 (R;US)
Microstructure
Using diffusion measurements to determine pore-size distributions in porous materials, 8:54528 (J;GB)
Sound Waves
Double porosity model for acoustic wave propagation in fractured-porous rock, 8:55228 (R;US)
Surface Coating
Method for depositing a uniform layer of particulate material on the surface of an article having interconnected porosity, 8:54369 (P;US)

PORTS
See HARBORS

POSITION INDICATORS
See DISPLACEMENT GAGES

POSITION SENSITIVE DETECTORS
Digital Systems
Development of a new digital divider system for the charge division method, 8:54688 (R;JP;In Japanese)
Electron Spectrometers
High resolution position detecting system with a SWPC for electron spectroscopy, 8:54685 (R;JP)
Ge Semiconductor Detectors
Position-sensitive semiconductor detectors of nuclear radiations, 8:54695 (R;SU;In Russian)
Performance
Measurement of the radioactive aerosol diameter by position sensitive detectors, 3, 8:54734 (R;JP;In Japanese)
Si Semiconductor Detectors
Position-sensitive semiconductor detectors of nuclear radiations, 8:54695 (R;SU;In Russian)

POSITIVE IONS
See CATIONS

POSITRON BEAMS
Beam Production
Intense positron beams and possible experiments, 8:55106 (R;US)
Production of slow positrons beams with an electron linac, 8:54630 (BA;NL)

POSITRON CAMERAS
Construction
Positron ring system using one-dimensional Anger-type detectors. Progress report, January 1, 1983-December 31, 1983, 8:54676 (R;US)
Performance
Positron ring system using one-dimensional Anger-type detectors. Progress report, January 1, 1983-December 31, 1983, 8:54676 (R;US)

POSITRON CHANNELING
On-Line Measurement Systems
Spectrometer for studying spontaneous radiation emitted during high-energy electron and positron channeling in monocrystals, 8:54704 (R;SU;In Russian)

POSITRON DETECTION
Cherenkov Counters
Spectrometer for studying spontaneous radiation emitted during high-energy electron and positron channeling in monocrystals, 8:54704 (R;SU;In Russian)

POSITRON-ELECTRON-PROTON STORAGE RING
See PEP STORAGE RINGS

POTABLE WATER
See DRINKING WATER

POTASSIUM
Activation Analysis
Elemental composition of human and animal milk. A review. A report prepared under the auspices of the IAEA in collaboration with the WHO, 8:54983 (R;XA)
Catalytic Effects
Effects of potassium promotion on the activity and selectivity of iron Fischer-Tropsch catalysts, 8:54319 (J;US)
Equations of State
Piston-displacement equations of state for sodium, potassium, and rubidium metals to 20 kbar from 300 K to 4 K, 8:54275 (R;US)
Thermal Diffusion
Thermodiffusional transport in pelagic clay: implications for nuclear waste disposal in geological media, 8:53683 (J;US)

POTASSIUM 40
Food Chains
Preliminary investigation of radiation level and some radionuclides in imported food and food products, 8:54295 (R;TH)
Gamma Spectroscopy
Preliminary investigation of radiation level and some radionuclides in imported food and food products, 8:54295 (R;TH)
Radioecological Concentration
Radiological impact of the operation of coal-fired power stations within Australia, 8:53365 (RA;AU)
The relative importance of uptake and surface adherence in determining the radionuclide contents of subterranean crops, 8:54929 (J;GB)

POTASSIUM CARBIDES
Phonons
Phonon dispersion of transverse basal-plane modes in alkali-graphite compounds, 8:54253 (R;US)
POTASSIUM CARBONATES
Catalytic Effects
Effects of catalysts and CO_2 gasification on the ESR of carbon black. II, 8:53357 (J;US)
Study of the role of alkali metal salts as char gasification catalysts by Knudsen cell mass spectrometry, 8:53356 (J;US)
POTASSIUM COMPOUNDS
See also POTASSIUM CARBIDES
POTASSIUM CARBONATES
Catalytic Effects
Effects of catalysts and CO_2 gasification on the ESR of carbon black. II, 8:53357 (J;US)
POWER POOLS
See INTERCONNECTED POWER SYSTEMS
POWER REACTORS
See also AVR REACTOR
BEZNAU-1 REACTOR
BN-350 REACTOR
BOR-60 REACTOR
BROWNS FERRY-1 REACTOR
GUNDREMMINGEN-2 REACTOR
HBWR REACTOR
HINKLEY POINT-B REACTOR
JOYO REACTOR
JPDR REACTOR
LACBWR REACTOR
LINGEN REACTOR
LUCENS REACTOR
NIEDERAICHBACH REACTOR
N-REACTOR
PATHFINDER REACTOR
PEACH BOTTOM-2 REACTOR
PEACH BOTTOM-3 REACTOR
ROBINSON-2 REACTOR
SHIPPINGPORT REACTOR
SHOREHAM REACTOR
SRE REACTOR
THREE MILE ISLAND-2 REACTOR
TURKEY POINT-3 REACTOR
TURKEY POINT-4 REACTOR
WAGR REACTOR
Radiation Hazards
New NRC methodology for estimating biological risks from exposure to ionizing radiation, 8:55019 (RA;US)
Steam Systems
STP: A mathematically and physically consistent library of steam properties, 8:53926 (J;US)
POWER SUPPLIES
See also PHOTOVOLTAIC POWER SUPPLIES
Function Generators
Problem of magnet ramping, 8:54634 (R;US)
Monitors
SLAC analog status monitor Mod II (Engineering Materials), 8:54635 (E;US)
POWER SYSTEMS
Includes electric power networks with associated generating and transmission facilities.
See also INTERCONNECTED POWER SYSTEMS
Circuit Breakers
TVA's dispersed generation protection requirements - what do they mean, 8:54104 (R;US)
Control Theory
Decentralized control of large transient in power systems: theory and application. Final report, January 1981-August 1983, 8:53855 (R;US)
POWER TRANSMISSION LINES
Electric Sparks
Fuel ignition by high voltage capacitive discharges, 8:53863 (R;US)
Resistance Heating
Guidelines for assessing overview line connectors using infra-red thermovision, 8:53864 (R;US)
Temperature Measurement
Calculations of the temperature rise of overhead distribution connectors, 8:53865 (R;US)
PRASEODYMIUM 143
Energy-Level Transitions
γ-ray emission probability for the decay of ^{143}Ce, 8:55191 (J;GB)
PRECIPITATIONS (ATMOSPHERIC)
See ATMOSPHERIC PRECIPITATIONS
PREDICTION
See FORECASTING
PREGNANCY
Diagnosis
Initial study of wild horse and burro demography: determination of pregnancy and lactation rates in various herds. Final report, 8:54908 (R;US)
PRESSURE GAGES
See also VACUUM GAGES
Design
Precision manometer gauge, 8:54777 (P;US)
Pressure-sensitive optrode, 8:54776 (P;US)
Optical Fibers
Pressure-sensitive optrode, 8:54776 (P;US)
PRESSURE VESSELS
Activity Levels
Neutron activation of reactor pressure vessel and biological shield of the decommissioned Gundremmingen Unit A Nuclear Power Station, 8:54001 (RA;US)
Calibration
Temperature calibration of a new rapid quench vessel, 8:55082 (J;US)
Research Programs
Prestressed concrete reactor vessel research and development studies at the Oak Ridge National Laboratory, 8:53891 (BA;GB)
Transport
Transportation of the reactor vessel/internals of retired nuclear power plants as a single package, 8:53871 (RA;US)
PRESSURIZED WATER COOLED MODERATED REACTO
See PWR TYPE REACTORS
PRESSURIZED WATER REACTORS
See PWR TYPE REACTORS
PRICES
Prior to June 1979, CHARGES was used.
Spatial price duopoly under uniform delivered pricing, 8:54106 (J;GB)
PRIMARY COOLANT CIRCUITS
Pumps
Seismic Safety Margins Research Programs. Assessment of potential increases in risk due to degradation of steam generator and reactor coolant pump supports (PWR), 8:54032 (R;US)
PRINCETON LARGE TORUS
See PLT DEVICES
PROCESS HEAT REACTORS
Economics
Economic evaluation of the steam-cycle high-temperature gas-cooled reactor, 8:53910 (R;US)
HTGR Type Reactors
Design of reactor protection systems for HTR plants generating electric power and process heat problems and solutions, 8:53888 (R;XA)
Pebble Bed Reactors
Core-adjacent instrumentation systems for pebble bed reactors for process heat application - state of planning, 8:53886 (R;XA)
Power Generation
Economic evaluation of the steam-cycle high-temperature gas-cooled reactor, 8:53910 (R;US)
PROCESS SOLUTIONS
Chemical Composition
Differential optical absorption techniques for diagnostics of coal gasification. Technical progress report, April-June 1983, 8:53368 (R;US)
PROCESSING (DATA)
See DATA PROCESSING
PROCESSING (WASTES)
See WASTE PROCESSING
PRODUCTION (HYDROGEN)
See HYDROGEN PRODUCTION
PROFESSIONS
See OCCUPATIONS

PROGRAMMING LANGUAGES
Standards
Comments on ISO/TC 97/SC 18/WG3 N120, 8:55331 (R;US)
PROJECTILES
Hazards
Effect of base gaps on setback-shock sensitivities of cast composition B and TNT as determined by the NSWC setback-shock simulator, 8:54855 (RA;US)
PROJECTION SPARK CHAMBERS
Search for proton decay and solar neutrinos with a liquid TPC, 8:54652 (RA;US)
Design
Research and development program on dense TPC's at LBL, 8:54651 (RA;US)
Performance
Research and development program on dense TPC's at LBL, 8:54651 (RA;US)
PROJECTORS (SCANNING)
See SCANNING MEASURING PROJECTORS
PRONGS
See PARTICLE TRACKS
PROPANE
Combustion Products
Study of factors affecting soot formation in a swirl-stabilized combustor. Final report 22 Jan 80-30 Sep 82, 8:53443 (R;US)
Pyrolysis
Shock-tube study of propane pyrolysis. Rate of initial dissociation from 1400 to 2300 K, 8:54366 (J;US)
1-PROPANOL
See PROPANOLS
2-PROPANOL
See PROPANOLS
PROPANOLS
Chemical Reactions
Kinetics and mechanism of the oxidation of hexaaquovanadium(II) ions by aliphatic radicals, 8:54314 (J;US)
PROPANONE
See ACETONE
PROPELLANTS
Combustion
Improved prediction of flame spreading during convective burning in solid propellant cracks, 8:54361 (RA;US)
Cracks
Improved prediction of flame spreading during convective burning in solid propellant cracks, 8:54361 (RA;US)
Flame Propagation
Improved prediction of flame spreading during convective burning in solid propellant cracks, 8:54361 (RA;US)
Sensitivity
Instrumented shotgun facility to study impact initiated explosive reactions, 8:54810 (RA;US)
PROPENE
See PROPYLENE
PROPORTIONAL COUNTERS
See also MULTIWIRE PROPORTIONAL CHAMBERS
Circuit Theory
Theoretical analysis of charge division proportional counter, 8:54687 (R;JP;In Japanese)
Performance Testing
High resolution position detecting system with a SWPC for electron spectroscopy, 8:54685 (R;JP)
Position Sensitive Detectors
High resolution position detecting system with a SWPC for electron spectroscopy, 8:54685 (R;JP)
Theoretical analysis of charge division proportional counter, 8:54687 (R;JP;In Japanese)
PROPYL ALCOHOLS
See PROPANOLS
PROPYLENE
Combustion Products
Study of factors affecting soot formation in a swirl-stabilized combustor. Final report 22 Jan 80-30 Sep 82, 8:53443 (R;US)
PROTACTINIUM ISOTOPES
Decay
Fifth research coordination meeting on the measurement and evaluation of transactinium isotope nuclear data. Central Bureau for Nuclear Measurements, Geel, Belgium, 1-3 September 1982. Summary report, 8:55195 (R;XA)
PROTECTION (RADIATION)
See RADIATION PROTECTION
PROTECTIVE CLOTHING
Intervention device for use in a hostile environment, 8:54377 (RA;US)
Performance Testing
Laboratory evaluation of RACAL airstream helmet, 8:55076 (R;US)
PROTEINS
See also PEPTIDES
Biosynthesis
L-[1-^{11}C]leucine: routine synthesis by enzymatic resolution, 8:54348 (J;US)
Chemical Reactions
Rate constants for the decay and reactions of the lowest electronically excited singlet state of molecular oxygen in solution, 8:54343 (J;US)
PROTON BEAMS
Beam Bunching
Rates and time structure expected from $\sqrt{s}$ = 40 TeV colliders, 8:54592 (RA;US)
Beam Extraction
Slaw extracted proton beam formation and monitoring for the "QUARTZ" setup, 8:54579 (R;SU;In Russian)
Beam Luminosity
Rates and time structure expected from $\sqrt{s}$ = 40 TeV colliders, 8:54592 (RA;US)
Beam Monitors
Slaw extracted proton beam formation and monitoring for the "QUARTZ" setup, 8:54579 (R;SU;In Russian)
PROTON DETECTION
Cherenkov Counters
Cedar counters for particle identification in the SPS secondary beams: A description and an operation manual, 8:54672 (R;XC)
PROTON REACTIONS
Inelastic Scattering
Experimental determination of the effective nucleon-nucleon interaction for P-nucleus reactions at intermediate energies, 8:55176 (J;NL)
Pickup Reactions
Deuteron production in proton-nucleus interactions at 7.5 GeV/c, 8:55183 (R;SU;In Russian)
PROTON RECOIL DETECTORS
Sensitivity
Calculation of the neutron sensitivity of thermoluminescent detectors. 3. Sensitivity of radiator-detector combinations for fast neutrons, 8:54740 (R;DD;In German)
PROTON SPECTROMETERS
Plastic Scintillators
Investigation of large cylindrical scintillation spectrometer section, 8:54698 (R;SU;In Russian)
PROTON-ANTIPROTON INTERACTIONS
Particle Production
Search for hadron jets and large transverse momentum electrons at the SPS anti p p collider, 8:55140 (RA;US)
PROTON-NEUTRON INTERACTIONS
Cross Sections
Hadronic interactions at energies around 10^3 TeV inferred from the large-scale emulsion chamber experiment at Mt. Fuji, 8:55147 (R;JP)
Particle Production
Hadronic interactions at energies around 10^3 TeV inferred from the large-scale emulsion chamber experiment at Mt. Fuji, 8:55147 (R;JP)
PROTON-PROTON INTERACTIONS
Particle Production
TOF for heavy stable particle identification, 8:54722 (RA;US)
Reviews
Nucleon-nucleon interactions and polarized-beam (both proton & antiproton) facilities at LAMPF II, 8:55135 (R;US)

PROTONS
Particle Decay
Theoretical perspective for baryon number violation, 8:55144 (RA;US)
Particle Production
Correlation effects in multiple particle production on nuclei in the cumulative region, 8:55169 (R;SU)
Weak Particle Decay
Geiger projection calorimeter, 8:54658 (RA;US)
Proceedings of the 1982 summer workshop on proton decay experiments, 8:55123 (R;US)
Prospects for very large, sensitive water Cherenkov detectors for proton decay and neutrino oscillations search, 8:54650 (RA;US)
Results from the Soudan 1 detector, 8:55124 (RA;US)
Review of the status of proton decay experiments outside the USA, 8:54649 (RA;US)
Search for proton decay and solar neutrinos with a liquid TPC, 8:54652 (RA;US)
PSI-3105 RESONANCES
Radiative Decay
Status of the iota (1440) and θ (1640) as gluonium candidates, 8:55141 (R;US)
PUBLIC BUILDINGS
Energy Conservation
Energy conservation in State buildings, 8:54130 (RA;US)
PUBLIC LANDS
Land Leasing
Leasing of federal surface lands for direct-use geothermal-energy developments, 8:53840 (R;US)
PUBLIC UTILITIES
See also ELECTRIC UTILITIES
GAS UTILITIES
Energy Efficiency
Energy-conservation programs: County of Hawaii, 8:54178 (RA;US)
Public Utility Regulatory Policies Act
Public Utility Regulatory Policies Act of 1978 (PURPA) and the State of Hawaii Public Utilities Commission (PUC) regulations, 8:54086 (RA;US)
Regulations
Public Utility Regulatory Policies Act of 1978 (PURPA) and the State of Hawaii Public Utilities Commission (PUC) regulations, 8:54086 (RA;US)
PUBLIC UTILITY REGULATORY POLICIES ACT
Economic Analysis
Public Utility Regulatory Policies Act of 1978 (PURPA) and the State of Hawaii Public Utilities Commission (PUC) regulations, 8:54086 (RA;US)
Historical Aspects
Public Utility Regulatory Policies Act of 1978 (PURPA) and the State of Hawaii Public Utilities Commission (PUC) regulations, 8:54086 (RA;US)
Implementation
Concerns in establishing PURPA regulations, 8:54087 (RA;US)
PUERTO RICO
Electric Power
Renewable energy technologies: models in the energy planning for Puerto Rico, 8:54112 (R;US)
Renewable Energy Sources
Renewable energy technologies: models in the energy planning for Puerto Rico, 8:54112 (R;US)
PULMONARY CANCER
See CARCINOMAS
PULMONARY LAVAGE
See LUNGS
PULPS
See SLURRIES
PULSE PILEUP
Monte Carlo simulation of the effect of pileup, 8:54728 (RA;US)
PULVERIZED FUEL ASH
See FLY ASH
PUMPS
Supports
Seismic Safety Margins Research Programs. Assessment of potential increases in risk due to degradation of steam generator and reactor coolant pump supports (PWR), 8:54032 (R;US)
PUREX PROCESS
Rockwell Hanford Operations monthly report summary, June 1983, 8:53474 (R;US)
PURITY
See IMPURITIES
PURPA
See PUBLIC UTILITY REGULATORY POLICIES ACT
PWR TYPE REACTORS
See also BEZNAU-1 REACTOR
OTTO HAHN REACTOR
ROBINSON-2 REACTOR
SHIPPINGPORT REACTOR
THREE MILE ISLAND-2 REACTOR
TURKEY POINT-3 REACTOR
TURKEY POINT-4 REACTOR
WWER TYPE REACTORS
Auxiliary Water Systems
Engineering factors influencing Corbicula fouling in nuclear-service water systems, 8:53869 (R;US)
Containment Buildings
Application of the TEMPEST computer code for simulating hydrogen distribution in model containment structures, 8:54035 (R;US)
Potential for containment leak paths through electrical penetration assemblies under severe accident conditions, 8:54030 (R;US)
Studies on fluid impurities due to accidents in the containment of PWR reactors, 8:54023 (R;DE;In German)
Containment Systems
Detonation of hydrogen-air mixtures, 8:54036 (R;US)
Control Rooms
Task analysis of nuclear-power-plant control-room crews: project approach methodology, 8:53944 (R;US)
ECCS
Investigtion of the system behaviour of a pressurised-water reactor in loss-of-coolant accidents: the PKL experiment, 8:54040 (TJ;GB)
Evaluation
Diagnostic system utilizing the fluctuated detector signals, 8:53895 (RA;JP;In Japanese)
Fuel Assemblies
Evaluation and demonstration of methods for improved fuel utilization. Seventh semi-annual progress report, October 1, 1982-March 31, 1983, 8:53874 (R;US)
Loss of Coolant
Application of the TEMPEST computer code for simulating hydrogen distribution in model containment structures, 8:54035 (R;US)
Investigtion of the system behaviour of a pressurised-water reactor in loss-of-coolant accidents: the PKL experiment, 8:54040 (TJ;GB)
Studies on fluid impurities due to accidents in the containment of PWR reactors, 8:54023 (R;DE;In German)
Meltdown
Model for superheated debris-bed quench for severe-accident containment calculations, 8:53986 (R;US)
Pressure Vessels
Transportation of the reactor vessel/internals of retired nuclear power plants as a single package, 8:53871 (RA;US)
Primary Coolant Circuits
Seismic Safety Margins Research Programs. Assessment of potential increases in risk due to degradation of steam generator and reactor coolant pump supports, 8:54032 (R;US)
Radioactive Effluents
Population dose commitments due to radioactive releases from nuclear power plant sites in 1980, 8:53952 (R;US)
Reactor Accidents
Detonation of hydrogen-air mixtures, 8:54036 (R;US)
Experimental data report for Semiscale Mod-2B Power-Loss Test Series (Tests S-PL-1, -2, and -3), 8:54034 (R;US)
Potential for containment leak paths through electrical penetration assemblies under severe accident conditions, 8:54030 (R;US)

Reactor Components
Logical framework for identifying equipment important to safety in nuclear power plants, 8:54028 (R;US)
PWR nuclear power stations in the German Federal Republic: operating experience with pressurized-water plants, 8:53877 (TJ;GB)
Reactor Decommissioning
Experience in treatment of components, waste treatment, packaging and shipping related to decommissioning, 8:53935 (RA;US)
Post-accident cleanup and decommissioning of a reference pressurized water reactor, 8:54013 (RA;US)
Reactor Dismantling
Experience in treatment of components, waste treatment, packaging and shipping related to decommissioning, 8:53935 (RA;US)
Transportation of the reactor vessel/internals of retired nuclear power plants as a single package, 8:53871 (RA;US)
Reactor Licensing
Regulatory licensing status summary report. Volume 12, No. 8. Nuclear power plants data for decisions (blue book), August 1-August 31, 1983, 8:53908 (R;US)
Reactor Materials
Hydrogen-generating reactions in LWR severe accidents, 8:54019 (R;US)
Reactor Noise
Diagnostic system utilizing the fluctuated detector signals, 8:53895 (RA;JP;In Japanese)
Reactor Operation
PWR nuclear power stations in the German Federal Republic: operating experience with pressurized-water plants, 8:53877 (TJ;GB)
Reactor Operators
Task analysis of nuclear-power-plant control-room crews: project approach methodology, 8:53944 (R;US)
Task analysis of nuclear-power-plant control-room crews, 8:53945 (R;US)
Reactor Safety
Advanced reactor safety research. Quarterly report, October-December 1981. Volume 20, 8:54027 (R;US)
PWR nuclear power stations in the German Federal Republic: operating experience with pressurized-water plants, 8:53877 (TJ;GB)
Spent Fuel Elements
Experience with fuel damage caused by abnormal conditions in handling and transport, 8:53868 (RA;US)
Steam Generators
Seismic Safety Margins Research Programs. Assessment of potential increases in risk due to degradation of steam generator and reactor coolant pump supports, 8:54032 (R;US)
Thermodynamic Cycles
Nuclear power plants: structure and function, 8:53867 (R;US)
PYREX
Mirrors
Manufacture of mirrors by NC machining of EEM, 8:54473 (RA;JP;In Japanese)
PYRIDINES
See also QUINOLINES
Excitation
Electron-transfer quenching vs. exciplex-mediated quenching of the low-lying excited states in phthalocyanines, 8:54315 (J;US)
PYROLYSIS
Additives
Effects of additives upon the thermal degradation of subbituminous coals, 8:53353 (J;NL)
Research Programs
Liquid-fuel research in Hawaii, 8:53768 (RA;US)
Sampling
Direct mass-spectrometric studies of the pyrolysis of carbonaceous fuels. I. A flame-pyrolysis molecular-beam sampling technique, 8:53352 (J;NL)

Q

QUADRUPOLE LINACS
Design
Radio-frequency quadrupole resonator for linear accelerator, 8:54567 (P;US)
Stabilized radio-frequency quadrupole, 8:54628 (P;US)
Electric Fields
Measurement of the RF field on RFQ linac model cavities, 8:54581 (R;JP)
Inertial Confinement
Low velocity linac, 8:54564 (RA;JP)
RF Systems
Low velocity linac, 8:54564 (RA;JP)
QUALITY ASSURANCE
Management
Management of QA in an R and D organization, 8:55327 (R;US)
QUANTUM CHROMODYNAMICS
Lattice Field Theory
Lattice QCD with light quark masses: Does chiral symmetry get broken spontaneously, 8:55146 (R;DE)
QUANTUM MECHANICS
Quantum correspondence to classical chaos, 8:55229 (J;NL)
Two-Body Problem
Sturm solutions of two-center problem in quantum mechanics, 8:55226 (R;SU;In Russian)
QUARK MATERIAL
See QUARK MATTER
QUARK MATTER
Nuclear beams and targets, 8:55198 (RA;XC)
Perspectives in high energy nuclear collisions, 8:55190 (R;US)
Production
Quark-gluon plasma formation, 8:55152 (R;US)
QUARK PLASMA
See QUARK MATTER
QUARK SEA
See QUARK MATTER
QUARK-GLUON PLASMA
See QUARK MATTER
QUARKS
Photoproduction
High-energy photoproduction of states containing heavy quarks and other rare phenomena, 8:55137 (R;US)
QUINOLINES
Solvent Properties
Effect of solvent pretreatment on coal liquefaction, 8:53361 (J;US)

R

R CODES
Benchmarks
Benchmarking of RADTRAN II, 8:53486 (RA;US)
R-1 REACTOR
Reactor Dismantling
Dismantling of the R1 reactor, Stockholm, 8:53996 (RA;US)
RADIANT HEAT TRANSFER
Computer Codes
FACET: a radiation view factor computer code for axisymmetric, 2D planar, and 3D geometries with shadowing, 8:54525 (R;US)
RADIATION ACCIDENTS
Computerized Simulation
Functional requirements for an Exercise Evaluation and Simulation Facility, 8:54022 (R;US)
Emergency Plans
Evacuation emergency response model coupling atmospheric release advisory capability output, 8:54037 (R;US)
RADIATION BURDEN
See RADIATION DOSES

RADIATION DECONTAMINATION
See DECONTAMINATION
RADIATION DETECTION
See also CHARGED PARTICLE DETECTION
GAMMA DETECTION
KAON DETECTION
NEUTRINO DETECTION
NEUTRON DETECTION
X-RAY DETECTION
Geiger-Mueller Counters
Measurement of environmental radioactivity in Toki district, 8:54690 (R;JP;In Japanese)
RADIATION DETECTORS
See also CHERENKOV COUNTERS
DIELECTRIC TRACK DETECTORS
IONIZATION CHAMBERS
POSITION SENSITIVE DETECTORS
PROPORTIONAL COUNTERS
SCINTILLATION COUNTERS
SEMICONDUCTOR DETECTORS
SHOWER COUNTERS
SPARK COUNTERS
WHOLE-BODY COUNTERS
Radiation measurement capability for decontamination to unrestricted use, 8:53628 (RA;US)
Data Acquisition Systems
SLAC M TAC M SHAM Auxiliary Backplane No. 2 (Engineering Materials), 8:54600 (E;US)
Meetings
Collider detectors: present capabilities and future possibilities, 8:54706 (R;US)
Solenoids
Detector with a 3 T solenoid for a 10 TeV collider, 8:54725 (RA;US)
TeV Range 10-100
Detector systems, 8:54712 (RA;US)
RADIATION DOSEMETERS
See DOSEMETERS
RADIATION DOSES
Calculation Methods
Cell labeling: radiation dose and effects, 8:55047 (J;US)
Radiation dosimetry for epidemiology lung cancer study, 8:55032 (RA;US)
Corrections
Determination of factors for the conversion of exposure to absorbed dose to water for x-rays less than 150 kV., 8:55208 (RA;AU)
Dose Equivalents
Multiplying factors used for the calculation of effective dose equivalent, 8:55209 (RA;AU)
Forecasting
Imprecision in estimates of dose from ingested ^{137}Cs due to variability in human biological characteristics, 8:55062 (J;GB)
Phantoms
Tissue to air ratios for open-cut uranium mine employees: a simulation using circular plane sources, 8:55000 (RA;AU)
Risk Assessment
Radiation risks and benefits: politics and morality, 8:55004 (RA;US)
RADIATION EXPOSURE (DOSES)
See RADIATION DOSES
RADIATION HAZARDS
Contamination Regulations
Code of practice against radiation hazards at PINSTECH, 8:55213 (R;PK)
Epidemiology
Computerized micrographics in processing hard-copy records for an epidemiologic study, 8:55022 (RA;US)
Data requirements for meaningful long-term epidemiology study of the commercial nuclear power industry, 8:55021 (RA;US)
Radiation Protection Laws
Code of practice against radiation hazards at PINSTECH, 8:55213 (R;PK)
Risk Assessment
Data requirements for meaningful long-term epidemiology study of the commercial nuclear power industry, 8:55021 (RA;US)
RADIATION HYGIENE
See RADIATION PROTECTION
RADIATION MONITORS
Calibration
Construction of radon/radon daughter calibration chamber, 8:54659 (RA;AU)
RADIATION PROTECTION
Cost Benefit Analysis
Guest editorial: concern over recent use of the ALARA philosophy, 8:55048 (J;GB)
Meetings
Epidemiology applied to health physics, 8:55003 (R;US)
Recommendations
Utilization of epidemiological data in the development of radiation protection recommendations, 8:55017 (RA;US)
RADIATION SAFETY
See RADIATION PROTECTION
RADIATION SOURCES
For cosmic sources of radiation see also COSMIC GAMMA SOURCES, COSMIC RADIO SOURCES, and COSMIC X-RAY SOURCES.
See also SYNCHROTRON RADIATION SOURCES
Surface Coating
Preparation of ultra-thin sources and calibration standards for coincident studies, at high resolution, of radiations emitted by the heavy elements, 8:55210 (RA;AU)
Transport
SSITS cask: a capsule transportation system, 8:53540 (RA;US)
RADIATIONS
See also BACKGROUND RADIATION
ELECTROMAGNETIC RADIATION
IONIZING RADIATIONS
SOLAR RADIATION
Research Programs
Report of the Central Institute for Isotope and Radiation Research, 8:53729 (R;DD)
Report of the Central Institute for Isotope and Radiation Research, 8:53728 (R;DD)
RADIOACTIVE AEROSOLS
Inhalation
Calculating the gastrointestinal tract activity following the inhalation of a radioactive aerosol, 8:55049 (J;GB)
Radiation Monitoring
Measurement of the radioactive aerosol diameter by position sensitive detectors, 3, 8:54734 (R;JP;In Japanese)
RADIOACTIVE BIOLOGICAL WASTES
See RADIOACTIVE WASTES
RADIOACTIVE EFFLUENTS
Environmental Impacts
Population dose commitments due to radioactive releases from nuclear power plant sites in 1980, 8:53952 (R;US)
Geochemistry
Predictive geochemical modeling of interactions between uranium-mill-tailings solutions and sediments in a flow-through system: model formulations and preliminary results, 8:54926 (R;US)
RADIOACTIVE GASEOUS WASTES
See RADIOACTIVE WASTES
RADIOACTIVE MATERIALS
See also RADIOACTIVE WASTES
Classification
IAEA regulations for the safe transport of radioactive materials: revised A_1 and A_2 values, 8:53480 (RA;US)
Method of determination of A_2 for a mixture of radionuclides, 8:53499 (RA;US)
Government Policies
Overview of the US government's nuclear materials shipping program: past, present, future, 8:53516 (RA;US)
Health Hazards
Use of PRIM code to analyze potential radiation-induced genetic and somatic effects to man from Jackpile-Paguate mines, 8:55030 (RA;US)
Information Systems
Legislative and Regulatory Information System: a research tool for transporting radioactive materials, 8:53502 (RA;US)
Land Transport
Carriage of radioactive substances in Europe in consideration of the provisions of the road traffic law, including the

possibilities of taking into account the 1984 version of the IAEA regulations, 8:53483 (RA;US)
Transport of RAM in tanks: how to fit into the IAEA safety philosophy, 8:53481 (RA;US)

Packaging
Analysis of NEPA/CEQ requirements with respect to nuclear materials packaging and transportation, 8:53537 (RA;US)
Containment system evaluation, 8:54407 (RA;US)
Design of radioactive material shipping packaging for low-velocity puncture resistance, 8:54388 (RA;US)
Guide to quality assurance measures for manufacturing and use of RAM packagings, 8:54452 (RA;US)
International ISO standards on packaging and transport of radioactive materials, 8:53572 (RA;US)
Licensing experience in obtaining approval of Type B packaging, 8:53484 (RA;US)
PATRAM '83: 7th international symposium on packaging and transportation of radioactive materials, 8:53477 (R;US)
RAMPAC: a database of certified packaging for radioactive materials, 8:53546 (RA;US)
Safety assessment and fire test on Type B packages of combustible thermal insulator for radioactive materials, 8:53485 (RA;US)
Thermal analysis of packaging using the integral method, 8:53542 (RA;US)

Physical Protection
How to sit most comfortably between two chairs or how to implement physical protection measures for transport, 8:53715 (RA;US)
Physical security measures for the transportation of specially categorized nuclear material, 8:53717 (RA;US)

Public Opinion
Enhancing public acceptance through improving and enlarging public understanding, 8:53500 (RA;US)

Rail Transport
Beyond the Association of American Railroads and Department of Energy workshop in 1981, 8:53539 (RA;US)
DOE transportation programs: computerized techniques, 8:53579 (RA;US)
Model railroad industry nuclear emergency response plant, 8:53708 (RA;US)
Planning of railway transport of radioactive materials as a consequence of the public concern: the role of competent authority, 8:53512 (RA;US)
Radiation exposure due to railway transport of radioactive materials, 8:53704 (RA;US)
Stowing of packages containing radioactive materials on conveyances in normal and accidental conditions, 8:53569 (RA;US)
US Department of Energy sponsored techniques for computerzed transportation routing analysis, 8:53528 (RA;US)

Road Transport
DOE transportation programs: computerized techniques, 8:53579 (RA;US)
HIGHWAY, a transportation routing model: program description and users' manual, 8:53581 (R;US)
Overview of DOE/PNC joint program on transportation technology, 8:53509 (RA;US)
Radioactive material transportation: the large quantity problem, 8:53513 (RA;US)
Risk assessment for truck-transport assuming different concepts of the back-end of the fuel cycle, 8:53699 (RA;US)
Stowing of packages containing radioactive materials on conveyances in normal and accidental conditions, 8:53569 (RA;US)
Truck transportation in the nuclear fuel cycle, 8:53523 (RA;US)
US Department of Energy sponsored techniques for computerzed transportation routing analysis, 8:53528 (RA;US)
Worlwide risk assessment on the transportation of radioactive materials, 8:53489 (RA;US)

Routing
Analysis of population densities along transportation routes, 8:53487 (RA;US)

Security
Cargo security: a review of physical security techniques for shipping radioactive materials, 8:53714 (RA;US)

Transport
Acceptability criterion applicable to accidental cases in the transport of radioactive materials, 8:53492 (RA;US)
Analyses of notification, routing, and packaging for shipments of nuclear materials, 8:53515 (RA;US)
Analysis of population densities along transportation routes, 8:53487 (RA;US)
Analysis of NEPA/CEQ requirements with respect to nuclear materials packaging and transportation, 8:53537 (RA;US)
Carrier's real world when transporting radioactive materials for the United States government, 8:53521 (RA;US)
Cost model for the transportation of nuclear wastes, 8:53556 (RA;US)
Critical evaluation of the results given by the INTERTRAN code: an example of parametric analysis to study the influence of the various components on the final result, 8:53490 (RA;US)
Current status of research and development for safe transport of nuclear materials in Japan, 8:53507 (RA;US)
Department of Energy: Transportation Operations and Management System, 8:53517 (RA;US)
Development of a model for the assessment of radiation dose received by workers in the transport of radioactive materials, 8:53702 (RA;US)
Emergency response guidelines for state and local governments for radioactive material transportation accidents, 8:53706 (RA;US)
Enhancing public acceptance through improving and enlarging public understanding, 8:53500 (RA;US)
Generic evaluation of the radiological impacts of transportation within the nuclear fuel cycle, 8:53498 (RA;US)
How safety procedures can follow the evolution in transport of RAM, 8:53479 (RA;US)
IAEA coordinated research programme on safe transport of radioactive materials, 8:53508 (RA;US)
Importance of reportable events on the public acceptance, 8:53535 (RA;US)
International ISO standards on packaging and transport of radioactive materials, 8:53572 (RA;US)
Meeting the challenge of the future in international transport operations: a transporter's point of view, 8:53520 (RA;US)
Need to increase public awareness of the safety of radioactive materials transport, 8:53532 (RA;US)
Overview of the US government's nuclear materials shipping program: past, present, future, 8:53516 (RA;US)
PATRAM '83: 7th international symposium on packaging and transportation of radioactive materials, 8:53477 (R;US)
Perceptions of risk in transporting radioactive material, 8:53534 (RA;US)
Physical security measures for the transportation of specially categorized nuclear material, 8:53717 (RA;US)
Problems of the educational training: quality and quantity of the workers involved in the transport of radioactive materials, 8:53573 (RA;US)
Radiation exposure resulting from the transport of radioactive materials within the United Kingdom, 8:53701 (RA;US)
Radioactive materials transportation: state regulation and enforcement, 8:53549 (RA;US)
Radioactive material information program, 8:53575 (RA;US)
Radioactive material transportation (RAMT) shipment study, 8:53577 (RA;US)
Recent development in the area of insurance and indemnity coverage for transportation of radioactive materials in the United States, 8:53533 (RA;US)
Review of selected nuclear transport event case histories, 8:53531 (RA;US)
Risk analysis methodologies for the transporatation of radioactive materials, 8:53695 (RA;US)
Shipping papers: cornerstone of radioactive material transportation, 8:53526 (RA;US)
Significant recent developemnts in the United States courts affecting nuclear materials transportation, 8:53538 (RA;US)

Statistical data on the transport of radioactive materials in Italy and radiation dose evaluation to transport workers, 8:53703 (RA;US)
Study of the exposures received by the persons involved in the transportation of radioactive materials, 8:53700 (RA;US)
Things that can go wrong when time is of the essence, 8:53710 (RA;US)
Transportation data base for the US Department of Energy, 8:53501 (RA;US)
US accident/incident experience in the transportation of nuclear fuel cycle material (1971-1982), 8:53525 (RA;US)

Transport Regulations
Controls necessary to assure regulatory compliance on radioactive material shipments, 8:53519 (RA;US)
Cooperative government/nuclear industry intervention in achieving motor carrier rules uniformity for transporting radioactive material, 8:53518 (RA;US)
IAEA regulations for the safe transport of radioactive materials: revised A_1 and A_2 values, 8:53480 (RA;US)
IAEA's role in achieving and assuring safety in the transport of radioactive materials, 8:53482 (RA;US)
Implementation of HM-164: an historical perspective, 8:53551 (RA;US)
Regulation versus reality, 8:53578 (RA;US)
Significant recent developemnts in the United States courts affecting nuclear materials transportation, 8:53538 (RA;US)
Transport of RAM in tanks: how to fit into the IAEA safety philosophy, 8:53481 (RA;US)

Transportation Systems
Criticality experiment program in support of nuclear materials transportation systems, 8:53563 (RA;US)

RADIOACTIVE PARTICULATES
See PARTICLES
RADIOACTIVE AEROSOLS

RADIOACTIVE TRACERS
See RADIOPHARMACEUTICALS

RADIOACTIVE WASTE DISPOSAL
Decommissioning of radioactively contaminated facilities from a state perspective, 8:53609 (RA;US)

Casks
Low-cost/high-capacity waste casks: the MOSAIK family, 8:53637 (RA;US)

Containers
Development of waste package designs for disposal in a salt repository, 8:53639 (RA;US)
Experience in treatment of components, waste treatment, packaging and shipping related to decommissioning, 8:53935 (RA;US)
Long-term performance of materials used for high-level waste packaging. Quarterly report, April-June 1983, 8:53656 (R;US)

Economics
Feasibility of co-disposing low-level radioactive waste with uranium mill tailings and/or FUSRAP waste, 8:53644 (R;US)

Environmental Effects
Radionuclide concentrations in vegetation at a solid radioactive waste-disposal area in southeastern Idaho, 8:54932 (J;US)

Environmental Impacts
Ecological Research Division Marine Research Program, 8:54951 (R;US)
Environmental characterization of bedded salt formations and overlying areas of the Permian Basin, 8:53689 (R;US)

Feasibility Studies
Feasibility of co-disposing low-level radioactive waste with uranium mill tailings and/or FUSRAP waste, 8:53644 (R;US)

Gaseous Wastes
Radioactive waste disposal by UKAEA establishments during 1981 and associated environmental monitoring results, 8:53603 (R;GB)

Geochemistry
Geochemical assessment of nuclear waste isolation. Report of activities during fiscal year 1982, 8:53649 (R;US)

High-Level Radioactive Wastes
Assessment of overseas developments in methods for treatment and disposal of high-level radioactive wastes, 8:53601 (R;AU)

Identification Systems
Durability of marker materials for nuclear waste isolation sites, 8:53670 (R;US)

Liquid Wastes
Radioactive waste disposal by UKAEA establishments during 1981 and associated environmental monitoring results, 8:53603 (R;GB)

Low-Level Radioactive Wastes
Feasibility of co-disposing low-level radioactive waste with uranium mill tailings and/or FUSRAP waste, 8:53644 (R;US)
Module container system for LAW disposal, 8:53636 (RA;US)
Potential low-level waste disposal limits for activation products from fusion, 8:53677 (R;US)
Shallow land burial handbook, 8:53642 (R;US)
Survey of statistical and sampling needs for environmental monitoring of commercial low-level radioactive waste disposal facilities, 8:53678 (R;US)
Use of DOE site selection criteria for screening low-level waste disposal sites on the Oak Ridge Reservation, 8:53674 (R;US)

Marine Disposal
Assessment of overseas developments in methods for treatment and disposal of high-level radioactive wastes, 8:53601 (R;AU)
Thermodiffusional transport in pelagic clay: implications for nuclear waste disposal in geological media, 8:53683 (J;US)

Mill Tailings
Consolidation of tailings, 8:53654 (R;US)
Design considerations for long-term stabilization of uranium mill tailings impoundments, 8:53655 (R;US)
Feasibility of co-disposing low-level radioactive waste with uranium mill tailings and/or FUSRAP waste, 8:53644 (R;US)

Monitoring
Radioactive waste disposal by UKAEA establishments during 1981 and associated environmental monitoring results, 8:53603 (R;GB)

Packaging
Experience in treatment of components, waste treatment, packaging and shipping related to decommissioning, 8:53935 (RA;US)
Long-term performance of materials used for high-level waste packaging. Quarterly report, April-June 1983, 8:53656 (R;US)

Radiation Monitoring
Survey of statistical and sampling needs for environmental monitoring of commercial low-level radioactive waste disposal facilities, 8:53678 (R;US)

Radionuclide Migration
Chemical transport in a fissured rock: verification of a numerical model, 8:53686 (J;US)

Salt Deposits
Assessment of overseas developments in methods for treatment and disposal of high-level radioactive wastes, 8:53601 (R;AU)
Overview of the regional geology of the Paradox Basin Study Region, 8:53658 (R;US)
Performance assessment of a shaft seals system in a HLW repository in the Gibson Dome area, 8:53673 (R;US)

Sealing Materials
Evaluation of clays and clay minerals for application to repository sealing, 8:53672 (R;US)
Performance assessment of a shaft seals system in a HLW repository in the Gibson Dome area, 8:53673 (R;US)
Rock mass sealing: experimental assessment of borehole plug performance. Annual report, June 1982-May 1983, 8:53657 (R;US)

Site Selection
Alternatives for management of wastes generated by the Formerly Utilized Sites Remedial Action Program, 8:53611 (RA;US)
Environmental characterization of bedded salt formations and overlying areas of the Permian Basin, 8:53689 (R;US)

Use of DOE site selection criteria for screening low-level waste disposal sites on the Oak Ridge Reservation, 8:53674 (R;US)

Solid Wastes
Radioactive waste disposal by UKAEA establishments during 1981 and associated environmental monitoring results, 8:53603 (R;GB)

Test Facilities
Impacts of transportation on a test and evaluation facility for nuclear waste disposal: a systems analysis, 8:53641 (RA;US)

Underground Disposal
Assessment of overseas developments in methods for treatment and disposal of high-level radioactive wastes, 8:53601 (R;AU)
Shallow land burial handbook, 8:53642 (R;US)

RADIOACTIVE WASTE FACILITIES

Geography
Numerical analysis of burial ground geography, 8:53684 (J;GB)

Interfaces
WIPP design flexibility for defense TRU waste transportation systems interface, 8:53504 (RA;US)

Materials Handling Equipment
Radwaste receiving and handling facilities for mine disposal, 8:53640 (RA;US)

Personnel
Some design considerations for cask handling at large-scale shipping and receiving facilities, 8:53713 (R;US)

Remote Handling Equipment
Some design considerations for cask handling at large-scale shipping and receiving facilities, 8:53713 (R;US)

Seismic Effects
Seismic evaluation of headframe and associated equipment, 8:53661 (R;US)

Shutdowns
Durability of marker materials for nuclear waste isolation sites, 8:53670 (R;US)

RADIOACTIVE WASTE MANAGEMENT
Rockwell Hanford Operations monthly report summary, June 1983, 8:53474 (R;US)

Comparative Evaluations
Alternatives for management of wastes generated by the Formerly Utilized Sites Remedial Action Program, 8:53611 (RA;US)

High-Level Radioactive Wastes
Assessment of overseas developments in methods for treatment and disposal of high-level radioactive wastes, 8:53601 (R;AU)

RADIOACTIVE WASTE PROCESSING

Combustion
Cyclone incinerator: operating experience, 8:53651 (R;US)
Evaluation of a processing technique for immobilization of low-level waste, 8:53650 (R;US)

High-Level Radioactive Wastes
Assessment of overseas developments in methods for treatment and disposal of high-level radioactive wastes, 8:53601 (R;AU)

Low-Level Radioactive Wastes
Cyclone incinerator: operating experience, 8:53651 (R;US)
Evaluation of a processing technique for immobilization of low-level waste, 8:53650 (R;US)

Research Programs
Rockwell Hanford Operations. Defense waste and byproducts management monthly report, 8:53681 (R;US)

Solidification
Assessment of overseas developments in methods for treatment and disposal of high-level radioactive wastes, 8:53601 (R;AU)
Evaluation of a processing technique for immobilization of low-level waste, 8:53650 (R;US)
Immobilization of radioiodine in synthetic boracite, 8:53688 (P;US)

Vitrification
Assessment of overseas developments in methods for treatment and disposal of high-level radioactive wastes, 8:53601 (R;AU)
Glass and nuclear wastes, 8:53606 (R;FR;In French)
Vitrification processes for fission product solutions, 8:53605 (R;FR;In French)

RADIOACTIVE WASTE STORAGE

Cements
Preliminary assessment of polymer-modified cements for use in immobilisation of intermediate level radioactive waste, 8:53602 (R;GB)

Feasibility Studies
Economical dry storage of large amounts of spent fuel and vitrified high level radioactive waste, 8:53599 (BA;XN)

Fuel-Cladding Interactions
Preliminary assessment of polymer-modified cements for use in immobilisation of intermediate level radioactive waste, 8:53602 (R;GB)

High-Level Radioactive Wastes
Combined storage for LWR spent fuel and high-level waste (MOdular DRy EXpandable storage system), 8:53527 (RA;US)
Economical dry storage of large amounts of spent fuel and vitrified high level radioactive waste, 8:53599 (BA;XN)
Monitored retrievable storage: a waste management option for spent fuel and high-level wastes, 8:53679 (R;US)
Storage and transportation of spent fuel and high-level waste using dry storage casks, 8:53497 (RA;US)

Intermediate-Level Radioactive Wastes
Preliminary assessment of polymer-modified cements for use in immobilisation of intermediate level radioactive waste, 8:53602 (R;GB)

Research Programs
Rockwell Hanford Operations. Defense waste and byproducts management monthly report, 8:53681 (R;US)

RADIOACTIVE WASTES
See also ALPHA-BEARING WASTES
HIGH-LEVEL RADIOACTIVE WASTES
INTERMEDIATE-LEVEL RADIOACTIVE WASTES
LOW-LEVEL RADIOACTIVE WASTES
RADIOACTIVE EFFLUENTS

Classification
Classifying decommissioning wastes for allocation to appropriate final repositories, 8:53629 (RA;US)
Isotopic analysis of radioactive waste packages (an inexpensive approach), 8:53638 (RA;US)

Maritime Transport
Nordic study on reactor waste, 8:53697 (RA;US)

Removal
Valve for controlling solids flow, 8:53932 (P;US)

Road Transport
Nordic study on reactor waste, 8:53697 (RA;US)

RADIOACTIVITY
For measured values of radioactivity and for unidentified radiation sources; not for experimental studies.
See also NATURAL RADIOACTIVITY

Calculation Methods
Calculating the gastrointestinal tract activity following the inhalation of a radioactive aerosol, 8:55049 (J;GB)

RADIOAPPLICATORS
See RADIATION SOURCES

RADIOAUTOGRAPHY
See AUTORADIOGRAPHY

RADIOCARBON DATING
See CARBON 14

RADIOCHEMICAL LABORATORIES
See HOT LABS

RADIOECOLOGY

Research Programs
Ecological Research Division Marine Research Program, 8:54951 (R;US)

Reviews
Radioecology, 8:54923 (R;DE;In German)

RADIOGRAPHS
See IMAGES

RADIOGRAPHY (AUTO)
See AUTORADIOGRAPHY

RADIOGRAPHY (BIOMEDICAL)
See BIOMEDICAL RADIOGRAPHY

RADIOGRAPHY (INDUSTRIAL)
See INDUSTRIAL RADIOGRAPHY

RADIOISOTOPE GENERATORS
Technetium 99
Effect of milking efficiency on Tc-99 content of Tc-99m derived from Tc-99m generators, 8:54344 (RA;AU)
RADIOISOTOPE KINETICS
See RADIONUCLIDE KINETICS
RADIOISOTOPE MIGRATION
See RADIONUCLIDE MIGRATION
RADIOISOTOPE-LABELLED DRUGS
See RADIOPHARMACEUTICALS
RADIOISOTOPES
See also NEUTRON-RICH ISOTOPES
Distribution
List of DOE radioisotope customers with summary of radioisotope shipments, FY 1982, 8:53731 (R;US)
Dose Equivalents
Estimates of internal-dose equivalent from inhalation and ingestion of selected radionuclides, 8:55046 (R;US)
Microdosimetry
Cell labeling: radiation dose and effects, 8:55047 (J;US)
Production
List of DOE radioisotope customers with summary of radioisotope shipments, FY 1982, 8:53731 (R;US)
RADIOLOGICAL PERSONNEL
Radiological assistance teams, 8:53707 (RA;US)
Training
Radiological response training for law enforcement personnel, 8:53709 (RA;US)
RADIOLOGICAL PROTECTION
See RADIATION PROTECTION
RADIONUCLIDE CONCENTRATION
See RADIOACTIVITY
RADIONUCLIDE DISTRIBUTIONS
See RADIONUCLIDE KINETICS
RADIONUCLIDE KINETICS
For radionuclides in living organisms only; see also TRANSLOCATION.
Biological Models
Retention of inhaled $^{238}PuO_2$ in Beagles: a mechanistic approach to description, 8:55058 (J;GB)
RADIONUCLIDE METABOLISM
See RADIONUCLIDE KINETICS
RADIONUCLIDE MIGRATION
In environment.
Algorithms
Geochemical assessment of nuclear waste isolation. Report of activities during fiscal year 1982, 8:53649 (R;US)
Inhibition
Review of waste package verification tests. Semiannual report, October 1982-March 1983, 8:53653 (R;US)
Mathematical Models
Chemical transport in a fissured rock: verification of a numerical model, 8:53686 (J;US)
Particle Resuspension
Computation of radionuclide particulate finite area fugitive source strengths, 8:54899 (J;GB)
RADIONUCLIDE TRANSFER (IN ENVIRONMENT)
See RADIONUCLIDE MIGRATION
RADIONUCLIDE TRANSFER (IN ORGANISMS)
See RADIONUCLIDE KINETICS
RADIONUCLIDE TURNOVER
See RADIONUCLIDE KINETICS
RADIONUCLIDES
See RADIOISOTOPES
RADIOPHARMACEUTICALS
Autoradiography
Quantitative autoradiography with radiopharmaceuticals, Part 2: Applications in radiopharmaceutical research: concise communication, 8:54969 (J;US)
Biological Localization
Differential radioactivity monitor for non-invasive detection of ocular melanoma, 8:54977 (P;US)
Chemical Preparation
L-[1-^{11}C]leucine: routine synthesis by enzymatic resolution, 8:54348 (J;US)
Chemical Properties
In vitro transfer of Ga-67 from transferrin to ferritin, 8:54347 (J;US)
Technetium 99
Effect of milking efficiency on Tc-99 content of Tc-99m derived from Tc-99m generators, 8:54344 (RA;AU)
Transport
Optimization of radiation protection in the transportation of radioisotopes, 8:53693 (RA;US)
RADIORESISTANCE
See RADIOSENSITIVITY
RADIOSENSITIVITY
Age Dependence
Impact of radiobiological considerations on epidemiological inferences of age-dependent radiosensitivity, 8:55038 (RA;US)
RADIOSURGERY
See RADIOTHERAPY
RADIOTHERAPY
Photoneutrons
Energy spectra of secondary neutrons produced by high energy bremsstrahlung in carbon, nitrogen, oxygen and tissue, 8:55207 (RA;AU)
Radiation Doses
Dose contribution due to photonuclear reactions during radiotherapy, 8:54998 (R;AU)
Dose due to photonuclear reactions in tissue during radiotherapy with high energy gamma rays, 8:55001 (RA;AU)
RADIOTHORIUM
See THORIUM 228
RADIUM 224
Delayed Radiation Effects
Epidemiological studies of German patients injected with Ra-224, 8:55015 (RA;US)
RADIUM 226
Delayed Radiation Effects
Age and dose as determinants of times of appearance of radium-induced osteosarcomas in humans, 8:55026 (RA;US)
Radioecological Concentration
Investigation of the speciation of radionuclides in sediments and soils, 8:54920 (RA;AU)
Radiological impact of the operation of coal-fired power stations within Australia, 8:53365 (RA;AU)
The relative importance of uptake and surface adherence in determining the radionuclide contents of subterranean crops, 8:54929 (J;GB)
RADIUM 228
Delayed Radiation Effects
Age and dose as determinants of times of appearance of radium-induced osteosarcomas in humans, 8:55026 (RA;US)
Radioecological Concentration
Radiological impact of the operation of coal-fired power stations within Australia, 8:53365 (RA;AU)
RADIUM D
See LEAD 210
RADIUM F
See POLONIUM 210
RADON
Adsorption
Removal of radon from water using granular activated carbon adsorption. Annual report, 8:54300 (R;US)
Air Samplers
Sampling strategies for indoor radon investigations, 8:54897 (RA;US)
Diffusion
Atmospheric dispersion of radon gas from a shallow, extended uranium ore body, 8:53467 (RA;AU)
Radioecological Concentration
Sampling strategies for indoor radon investigations, 8:54897 (RA;US)
RADON 220
Environmental Exposure Pathway
Background radioactivity in the monazite areas of Kerala, India, 8:54924 (R;DE)
RADON 222
Radioecological Concentration
Radon-222 and progeny measurements in typical east Tennessee residences, 8:54900 (J;GB)

RAIL TRANSPORT
Accidents
Model railroad industry nuclear emergency response plant, 8:53708 (RA;US)
Computerized Simulation
DOE transportation programs: computerized techniques, 8:53579 (RA;US)
US Department of Energy sponsored techniques for computerzed transportation routing analysis, 8:53528 (RA;US)
Environmental Impacts
Analysis of the impact of coal trains moving through Morehead City, North Carolina, 8:53398 (R;US)
Coal train movements through the city of Wilmington, North Carolina, 8:53397 (R;US)
RAILWAYS
Inland Waterways
Florida statewide coal-conversion study: coal-supply and transportation analysis, 8:53859 (R;US)
RAIN
See also ACID RAIN
Radiation Monitoring
Strontium-90 and cesium-137 in rain and dry fallout; April, 1978 to December, 1978. Radioactivity survey related with environmental and dietary materials, 8:54874 (RA;JP)
Radioactivity
Strontium-90 and cesium-137 in rain and dry fallout; April, 1978 to December, 1978. Radioactivity survey related with environmental and dietary materials, 8:54874 (RA;JP)
RAPID TRANSIT SYSTEMS
Planning
Comparative analysis study of alternative transit systems - South Hills Corridor. Final report, 8:54152 (R;US)
RARE EARTH COMPOUNDS
See also CERIUM COMPOUNDS
LANTHANUM COMPOUNDS
Crystal Field
Magnetism and crystal fields in ternary superconductors (RE Rh_4B_4), 8:54288 (BA;US)
Crystal-Phase Transformations
Electronically induced phase transformations. Annual report 1 Oct 81-30 Sep 82, 8:54270 (R;US)
Magnetic Properties
Coexistence of long-range magnetic order and superconductivity: an overview of ternary rare-earth compounds, 8:54273 (R;US)
Superconductivity
Coexistence of long-range magnetic order and superconductivity: an overview of ternary rare-earth compounds, 8:54273 (R;US)
RAREFIED GASES
Thermal Conduction
Heat conduction in rarefied gases between concentric cylinders: arbitrary accommodation on both surfaces, 8:53816 (RA;US)
RATE STRUCTURE
Data Compilation
Commercial energy costs for SOLCOST data bank cities, Winter 1982-1983, 8:54105 (R;US)
RAW MATERIALS
Availability
International developments on the sector of mineral raw material, 8:54067 (R;AT;In German)
Data Compilation
Use and resources of mineral raw material, statistical data on the raw material supply of Austria, 8:54064 (R;AT;In German)
Materials Recovery
Importance and possibilities of secondary cycles (recycling), substitution and innovation in mineral raw and primary material supply, 8:54065 (R;AT;In German)
Prices
International developments on the sector of mineral raw material, 8:54067 (R;AT;In German)
Recycling
Importance and possibilities of secondary cycles (recycling), substitution and innovation in mineral raw and primary material supply, 8:54065 (R;AT;In German)
Storage Facilities
Storage sites of solid mineral raw materials in Austria and their importance, 8:54063 (R;AT;In German)
Supply and Demand
Concept for supplying Austria with mineral raw- and primary material, 8:54066 (R;AT;In German)
Trade
International developments on the sector of mineral raw material, 8:54067 (R;AT;In German)
REACTIVITY
B Codes
BIPRUS code, 8:53937 (R;SU;In Russian)
REACTIVITY METERS
Calibration
Application of function generator for checking reactivity meter accuracy, 8:53942 (R;HU)
On-Line Measurement Systems
Reactivity meter for collective use on the base of the Electronica-100I computer, 8:53928 (R;SU;In Russian)
Reactor Instrumentation
Analog reactivity meter developed from modules of the instrument system for nuclear industry, 8:53941 (R;HU)
REACTIVITY WORTHS
Bubbles
Evaluation and modification of the probability table method for bubble reactivity worth calculations, 8:53923 (J;US)
Probabilistic Estimation
Evaluation and modification of the probability table method for bubble reactivity worth calculations, 8:53923 (J;US)
Void Coefficient
Evaluation and modification of the probability table method for bubble reactivity worth calculations, 8:53923 (J;US)
REACTOR ACCIDENTS
See also LOSS OF COOLANT
LOSS OF FLOW
MELTDOWN
REACTOR CORE DISRUPTION
Decontamination
Post-accident cleanup and decommissioning of a reference pressurized water reactor, 8:54013 (RA;US)
Heat Transfer
Experimental data report for Semiscale Mod-2B Power-Loss Test Series (Tests S-PL-1, -2, and -3) (PWR), 8:54034 (R;US)
Hydraulics
Experimental data report for Semiscale Mod-2B Power-Loss Test Series (Tests S-PL-1, -2, and -3) (PWR), 8:54034 (R;US)
Pressure Gradients
Detonation of hydrogen-air mixtures (PWR;BWR), 8:54036 (R;US)
Potential for containment leak paths through electrical penetration assemblies under severe accident conditions (PWR;BWR), 8:54030 (R;US)
Temperature Gradients
Potential for containment leak paths through electrical penetration assemblies under severe accident conditions (PWR;BWR), 8:54030 (R;US)
Test Facilities
Experimental data report for Semiscale Mod-2B Power-Loss Test Series (Tests S-PL-1, -2, and -3) (PWR), 8:54034 (R;US)
REACTOR CELLS
Neutron Flux
Calculating the thermal neutron fields in polycells with "black" blocks using the one-velocity p3-approximation and Monte-Carlo method, 8:53965 (R;SU;In Russian)
Program for neutron group calculation of a plane periodical reactor cell using the difference analog of the surface pseudosource method NEGR-PR, 8:53917 (R;SU;In Russian)
Reactor Kinetics
Program for neutron group calculation of a plane periodical reactor cell using the difference analog of the surface pseudosource method NEGR-PR, 8:53917 (R;SU;In Russian)
REACTOR COMPONENTS
See also CONTROL ELEMENTS
CORE CATCHERS
FUEL ELEMENTS
REACTOR COOLING SYSTEMS
REACTOR CORES

Performance Testing
Material surveillance program of JOYO, 8:53970 (R;JP)
Quality Assurance
Logical framework for identifying equipment important to safety in nuclear power plants (PWR; BWR), 8:54028 (R;US)
Reliability
Logical framework for identifying equipment important to safety in nuclear power plants (PWR; BWR), 8:54028 (R;US)
Risk Assessment
Logical framework for identifying equipment important to safety in nuclear power plants (PWR; BWR), 8:54028 (R;US)

REACTOR CONTROL RODS
See CONTROL ELEMENTS

REACTOR CONTROL SYSTEMS
Interactive Display Devices
Graphics display devices for an information measurement system of a research reactor, 8:53936 (R;SU;In Russian)
On-Line Measurement Systems
Software for the AIST measurement and calculational complex. Service routines for editing and statistical processing files on a magnetic tape, 8:53939 (R;SU;In Russian)

REACTOR CONTROL THEORY
See REACTOR KINETICS

REACTOR COOLING SYSTEMS
See also PRIMARY COOLANT CIRCUITS
Seismic Effects
Field in situ vibration testing of JOYO heat transport system piping, 8:53974 (R;JP)

REACTOR CORE DISRUPTION
Chemical Reactions
NaOH-rich corner of the (Na^+, Ca^{2+}) (OH^-, CO_3^{2-}) reciprocal system (LMFBR), 8:54031 (R;US)
Heat Transfer
Physics of reactor safety. Quarterly report, April-June 1983. Volume II (LMFBR), 8:54033 (R;US)
Hydraulics
Physics of reactor safety. Quarterly report, April-June 1983. Volume II (LMFBR), 8:54033 (R;US)

REACTOR CORE RESTRAINTS
Performance
Core support performance test in the component flow test loop, 8:53906 (BA;GB)

REACTOR CORES
See also COUPLED REACTOR CORES
Axially staggered seed-blanket reactor-fuel-module construction (LWBR), 8:53904 (P;US)
Neutron Spectra
Eigenvalue-dependent neutron energy spectra: Definitions, analyses, and applications, 8:53924 (J;US)
Reactivity
BIPRUS code, 8:53937 (R;SU;In Russian)

REACTOR DECOMMISSIONING
Vigorous decontamination tests of steel samples, 8:53999 (RA;US)
Activity Levels
Residual radioactivity assessment in nuclear power plants: concentrations, distribution inventories, 8:54000 (RA;US)
Comparative Evaluations
Decommissioning reference nuclear research and test reactors, 8:54009 (RA;US)
Cost
Costs of decommissioning nuclear power plants as reported to the public to date, 8:54015 (RA;US)
Decommissioning of Ames Laboratory Research Reactor, 8:53991 (RA;US)
Decommissioning of multiple-reactor stations: facilitation by sequential decommissioning, 8:54012 (RA;US)
Evaluation of immediate dismantlement of Candu reactors at the end of service life, 8:54007 (RA;US)
Preparing a decommissioning cost and technology study, 8:54006 (RA;US)
Utility planning for decommissioning, 8:54010 (RA;US)
Financing
Utility perspective of nuclear facility decommissioning, 8:53989 (RA;US)
Government Policies
Utility perspective of nuclear facility decommissioning, 8:53989 (RA;US)
Low-Level Radioactive Wastes
Exemption of low-level decommissioning waste from controlled handling and disposal, 8:53626 (RA;US)
Meetings
1982 international decommissioning symposium, 8:53988 (R;US)
Planning
Canadian approach to decommissioning, 8:54008 (RA;US)
Decommissioning of multiple-reactor stations: facilitation by sequential decommissioning, 8:54012 (RA;US)
Engineering and planning for the Shippingport Station Decommissioning Project, 8:54004 (RA;US)
Plans and activities for decommissioning of LWR power plants by the German utilities, 8:54003 (RA;US)
Preparing a decommissioning cost and technology study, 8:54006 (RA;US)
Utility planning for decommissioning, 8:54010 (RA;US)
Public Information
Costs of decommissioning nuclear power plants as reported to the public to date, 8:54015 (RA;US)
Radioactive Waste Management
Waste management impacts of US decommissioning activities, 8:53610 (RA;US)
Radioactive Wastes
Classifying decommissioning wastes for allocation to appropriate final repositories, 8:53629 (RA;US)
Research Programs
Decontamination research in the Commission of European Communities' programme on decommissioning of nuclear power plants, 8:54014 (RA;US)
Overview of decommissioning research and development activities in the European Community, 8:53997 (RA;US)
Safety
Decommissioning of NS OTTO HAHN, 8:53992 (RA;US)
Dismantling techniques for reactor components using explosives. Feasibility experiments for dismantling the biological shield and the pressure vessel of power reactors, 8:53998 (RA;US)
Safe containment of the Niederaichbach Nuclear Power Station (KKN), 8:53993 (RA;US)

REACTOR DISMANTLING
Transportation of the reactor vessel/internals of retired nuclear power plants as a single package, 8:53871 (RA;US)
Cost
Decommissioning of Lucens, 8:53994 (RA;US)
Evaluation of immediate dismantlement of Candu reactors at the end of service life, 8:54007 (RA;US)
Feasibility Studies
Dismantling techniques for reactor components using explosives. Feasibility experiments for dismantling the biological shield and the pressure vessel of power reactors, 8:53998 (RA;US)

REACTOR FUEL ELEMENTS
See FUEL ELEMENTS

REACTOR FUELS
See NUCLEAR FUELS

REACTOR INSTRUMENTATION
Meetings
Specialists' meeting on gas-cooled reactor core and high temperature instrumentation, Windermere, UK, 15-17 June 1982. Summary report, 8:53890 (R;XA)
Safety Engineering
Instrumentation of an HTR and its environmental conditions, 8:53884 (R;XA)

REACTOR KINETICS
Computer Calculations
Adaptation of the NF-6 complex programs to the ARAMAKO constants, 8:53896 (R;SU;In Russian)
Program for neutron group calculation of a plane periodical reactor cell using the difference analog of the surface pseudosource method NEGR-PR, 8:53917 (R;SU;In Russian)

Cross Sections
Cross-section adjustment with Monte Carlo sensitivities: Application to the Winfrith iron benchmark, 8:53927 (J;US)
Feynman Method
Derivation of Pal-Bell equations for two-point reactors, and its application to correlation measurements at KUCA, 8:53919 (RA;JP;In Japanese)
Finite Difference Method
Derivation of the finite difference equations for a heterogeneous reactor. 2. Square, triangular and double reactor lattices, 8:53915 (R;SU;In Russian)
Finite Element Method
Combined method of elements in solving the gas kinetic equation of neutron transport, 8:53898 (R;SU;In Russian)
Multigroup Theory
Program for neutron group calculation of a plane periodical reactor cell using the difference analog of the surface pseudosource method NEGR-PR, 8:53917 (R;SU;In Russian)
Neutron Transport
Capabilities of the BRAND program complex for simulating the neutron-physical experiments by the Monte-Calo method, 8:53914 (R;SU;In Russian)
Neutron Transport Theory
Combined method of elements in solving the gas kinetic equation of neutron transport, 8:53898 (R;SU;In Russian)
Photon Transport
Capabilities of the BRAND program complex for simulating the neutron-physical experiments by the Monte-Calo method, 8:53914 (R;SU;In Russian)
Reactivity Worths
Evaluation and modification of the probability table method for bubble reactivity worth calculations, 8:53923 (J;US)
Reactor Noise
Study of the stochastic point reactor kinetic equation, 8:53920 (RA;JP;In Japanese)
Rossi Alpha Method
Derivation of Pal-Bell equations for two-point reactors, and its application to correlation measurements at KUCA, 8:53919 (RA;JP;In Japanese)

REACTOR KINETICS EQUATIONS
Reactivity
Study of the stochastic point reactor kinetic equation, 8:53920 (RA;JP;In Japanese)

REACTOR LATTICES
Neutron Flux
Derivation of the finite difference equations for a heterogeneous reactor. 2. Square, triangular and double reactor lattices, 8:53915 (R;SU;In Russian)

REACTOR MATERIALS
To be assigned in conjunction with the specific descriptor for the material used in a reactor, provided this descriptor is not yet up-posted to reactor materials.
See also NUCLEAR FUELS
Chemical Reactions
Hydrogen-generating reactions in LWR severe accidents, 8:54019 (R;US)
Oxidation
Hydrogen-generating reactions in LWR severe accidents, 8:54019 (R;US)
Physical Radiation Effects
Swelling of high-nickel Fe-Ni-Cr alloys in EBR-II (Contribution to DAFS quarterly), 8:53929 (R;US)

REACTOR NOISE
Evaluation
Identification of nuclear reactor characteristics by the reactor noise analysis, 8:53943 (RA;JP;In Japanese)
Monitoring
Diagnostic system utilizing the fluctuated detector signals, 8:53895 (RA;JP;In Japanese)
Randomness
Detection of interactions between wave components at different frequencies of a random signal, 8:53921 (RA;JP;In Japanese)

REACTOR OPERATORS
Human Factors
Task analysis of nuclear-power-plant control-room crews, 8:53945 (R;US)
Performance
Task analysis of nuclear-power-plant control-room crews: project approach methodology, 8:53944 (R;US)
Task analysis of nuclear-power-plant control-room crews, 8:53945 (R;US)
Training
Task analysis of nuclear-power-plant control-room crews: project approach methodology, 8:53944 (R;US)
Task analysis of nuclear-power-plant control-room crews, 8:53945 (R;US)

REACTOR SAFETY
Research Programs
Advanced reactor safety research. Quarterly report, October-December 1981. Volume 20, 8:54027 (R;US)
List of reports concerning reactor safety research from BMFT, CEA, EPRI, JSTA, and USNRC, 8:54024 (R;DE;In German)
Research at full-scale: the HDR programme (Safety), 8:54039 (J;GB)

REACTOR SAFETY EXPERIMENTS
Loss of Coolant
Experimental and analytical investigation of uncovered core heat transfer under high pressure, low heat flux conditions, 8:54041 (J;NL)

REACTOR TECHNOLOGY
Nuclear reactor technology progress report, Volume 2. July-September 1980, 8:53978 (R;JP;In Japanese)
Research Programs
JOYO reactor technology progress report, Volume 5. April - June 1981, 8:53981 (R;JP;In Japanese)
Nuclear reactor technology progress report, Volume 3. October - December, 1980, 8:53979 (R;JP;In Japanese)
Nuclear reactor technology progress report, Volume 4. January - March, 1981, 8:53980 (R;JP;In Japanese)

REACTORS
See also GAS COOLED REACTORS
POWER REACTORS
PROCESS HEAT REACTORS
RESEARCH AND TEST REACTORS
THERMAL REACTORS
WATER MODERATED REACTORS
Neutron Leakage
Particle and radiation leakage importance: definition, analysis, and interpretation, 8:53925 (J;US)
Neutron Transport Theory
Eigenvalue-dependent neutron energy spectra: Definitions, analyses, and applications, 8:53924 (J;US)

RECEIVERS (SOLAR)
See SOLAR RECEIVERS

RECEPTORS
Binding Energy
Measurements, in vivo, of parameters of the dopamine system, 8:54972 (R;US)

RECLAMATION
See LAND RECLAMATION

RECREATIONAL AREAS
Environmental Quality
Beach communities and oil spills: environmental and economic consequences for Brunswick County, North Carolina. Summary report, 8:54957 (R;US)

RECYCLE (FUEL)
See FUEL CYCLE

RECYCLING
Economics
Industrial waste exchange: a mechanism for saving energy and money, 8:54074 (R;US)

REDUCTASES
See OXIDOREDUCTASES

REFRACTIVE INDEX
See REFRACTIVITY

REFRACTIVITY
Measuring Instruments
Ultrasensitive optical rotation and refractive-index measurements, 8:54294 (R;US)

REFRACTORIES
Corrosion
Durability of marker materials for nuclear waste isolation sites, 8:53670 (R;US)
Service Life
Durability of marker materials for nuclear waste isolation sites, 8:53670 (R;US)
Weathering
Durability of marker materials for nuclear waste isolation sites, 8:53670 (R;US)
REFRIGERATORS
See also HELIUM DILUTION REFRIGERATORS
Combined Cycles
Combined cold compressor/ejector helium-refrigerator cycle, 8:54376 (R;US)
Compressors
Combined cold compressor/ejector helium-refrigerator cycle, 8:54376 (R;US)
Design
Helium refrigerator with features for supercritical-pressure cooling, 8:54375 (R;US)
Economic Analysis
Supplement to: March 1982 consumer products efficiency standards, engineering analysis and economic analysis documents, 8:54135 (R;US)
Efficiency
Supplement to: March 1982 consumer products efficiency standards, engineering analysis and economic analysis documents, 8:54135 (R;US)
Performance
Helium refrigerator with features for supercritical-pressure cooling, 8:54375 (R;US)
Standards
Supplement to: March 1982 consumer products efficiency standards, engineering analysis and economic analysis documents, 8:54135 (R;US)
REFUELING WATER SYSTEMS
See AUXILIARY WATER SYSTEMS
REFUSE
See SOLID WASTES
REFUSE-FUELED BOILERS
Economic Analysis
Analysis of the financial impacts to the industrial energy user of using coal or municipal solid waste in a new process-steam-generating plant, 8:54185 (R;US)
Economic Impact
Analysis of the financial impacts to the industrial energy user of using coal or municipal solid waste in a new process-steam-generating plant, 8:54185 (R;US)
Simulation
Evaluation and test program of a 50-ton-per-day Lantz converter. Third quarterly technical progress report, 8:54183 (R;US)
Testing
Evaluation and test program of a 50-ton-per-day Lantz converter. Second quarterly technical progress report, 8:54182 (R;US)
REGENERATORS
Cryogenics
Experiment to determine properties of packed particle beds and regenerators at cryogenic temperatures, 8:54475 (R;US)
REGION I
See FEDERAL REGION I
REGION V
See FEDERAL REGION V
REGION VII
See FEDERAL REGION VII
REGION VIII
See FEDERAL REGION VIII
REGION X
See FEDERAL REGION X
REGOLITH
See OVERBURDEN
REGRESSION ANALYSIS
Monte Carlo Method
Estimation of the ridge constant: an approach based on the condition index, 8:55333 (R;US)
REGULATIONS
See also POLLUTION REGULATIONS
TRANSPORT REGULATIONS
Enforcement
Annual report and achievements 1975, 8:53406 (R;US)
Annual report and achievements 1976, 8:53407 (R;US)
Inspection
Annual report and achievements 1976, 8:53407 (R;US)
REM
See DOSE EQUIVALENTS
REMOTE HANDLING EQUIPMENT
Design
Some design considerations for cask handling at large-scale shipping and receiving facilities, 8:54405 (RA;US)
Specifications
Safety engineering: KTA Code of Practice. Lifting mechanisms in nuclear plant, 8:53933 (TG;GB)
RENEWABLE ENERGY SOURCES
See also BIOMASS
SOLAR ENERGY
WIND POWER
Governor's energy conference - Hawaii's energy options for the 80s, 8:54053 (R;US)
Energy Policy
Overview of renewable-energy development in Hawaii, 8:54107 (RA;US)
Meetings
Alternative sources of energy, 8:54111 (R;AT;In German)
Planning
Alternative sources of energy, 8:54111 (R;AT;In German)
State energy planning, 8:54084 (RA;US)
Resource Development
Energy programs for Pacific territories, 8:54085 (RA;US)
Overview of renewable-energy development in Hawaii, 8:54107 (RA;US)
Solar Energy
DOE renewable energy program, 8:54110 (R;US)
Technology Assessment
Alternative sources of energy, 8:54111 (R;AT;In German)
REPOWERING
See SOLAR REPOWERING
REPUBLIC OF KOREA
Coal Industry
Metallurgical coal in the 1980's - facts and prospects, 8:53423 (R;US)
RESEARCH AND TEST REACTORS
See also RESEARCH REACTORS
YAYOI REACTOR
Reactor Control Systems
Graphics display devices for an information measurement system of a research reactor, 8:53936 (R;SU;In Russian)
Reactor Decommissioning
Decommissioning reference nuclear research and test reactors, 8:54009 (RA;US)
RESEARCH REACTORS
See also AEROJET-GENERAL NUCLEONICS REACTORS
AFRRI REACTOR
ALRR REACTOR
BER-2 REACTOR
FMRB REACTOR
IBR-2 REACTOR
JMTR REACTOR
JRR-2 REACTOR
JRR-4 REACTOR
KUHFR REACTOR
KUR REACTOR
NBSR REACTOR
R-1 REACTOR
Burnable Poisons
Analytical study of using cadmium burnable absorbers in LEU fuel elements, 8:53958 (R;US)
CAMAC System
Multicomputer measurement centre of the Laboratory of nuclear physics - a prototype of computer network for automation of scientific research, 8:54693 (R;SU;In Russian)
Fuel Assemblies
Burnup-dependent cross-section data for research reactors, 8:53957 (R;US)

Fuel Cycle
Performance and fuel-cycle cost comparisons with HEU and LEU fuels, 8:53955 (R;US)
Fuel Elements
Status of RERTR fuel demonstrations, 8:53956 (R;US)
Fuel Plates
RERTR program progress in qualifying reduced-enrichment fuels, 8:53962 (R;US)
Reactor Cores
Analytical study of using cadmium burnable absorbers in LEU fuel elements, 8:53958 (R;US)
Current status of the US RERTR Program, 8:53963 (R;US)
Current status of the RERTR Program, 8:53959 (R;US)
Reactor Kinetics
Analytical study of using cadmium burnable absorbers in LEU fuel elements, 8:53958 (R;US)
Current status of the RERTR Program, 8:53959 (R;US)
Transients
PARET code and the analysis of the SPERT I transients, 8:54017 (R;US)

RESERVOIR ENGINEERING
Meetings
Proceedings of fifth workshop on Geothermal Reservoir Engineering, 8:53837 (R;US)

RESERVOIR ROCK
Bulk Density
Development of an improved method for the analysis of pressure-core samples. Final report, 8:53432 (R;US)
Drill Cores
Development of an improved method for the analysis of pressure-core samples. Final report, 8:53432 (R;US)
Oil Saturation
Assessment of gamma-inject logging techniques for the determination of residual oil saturation. Final report (Natural gamma background is first logged then radioactive fluids are injected into depleted reservoirs and the gamma signal returning to the borehole is measured), 8:53431 (R;US)
Development of an improved method for the analysis of pressure-core samples. Final report, 8:53432 (R;US)
Permeability
Development of an improved method for the analysis of pressure-core samples. Final report, 8:53432 (R;US)
Porosity
Development of an improved method for the analysis of pressure-core samples. Final report, 8:53432 (R;US)

RESERVOIRS (WATER)
See WATER RESERVOIRS

RESID
See PETROLEUM RESIDUES

RESIDENCES
See HOUSES

RESIDENTIAL BUILDINGS
See also HOUSES
District Heating
A. D. C. F. analysis of a Totem based district heating scheme, 8:54189 (R;US)
Energy Efficiency
Massachusetts Home Energy Rating System Project, 8:54143 (R;US)
Indoor Air Pollution
Issue backgrounder: the health impacts of home weatherization, 8:54134 (R;US)
Radiation Monitoring
Lung cancer mortality and indoor radon concentrations in 18 Canadian cities, 8:55035 (RA;US)
Solar Ponds
Feasibility of solar pond heating for northern cold climates, 8:53809 (R;US)
Weatherization
Economic feasibility of alternative utility-sponsored weatherization programs: the case of baltimore gas and electric company. Final report, 8:54141 (R;US)
Issue backgrounder: the health impacts of home weatherization, 8:54134 (R;US)

RESIDUAL OILS
See PETROLEUM RESIDUES

RESIDUES (RADIOACTIVE)
See RADIOACTIVE WASTES

RESONANCE
See also MAGNETIC RESONANCE
Computer Codes
Workshop on the derivation of average resonance parameters, 15-16 Oct 1981, Saclay (France), 8:55200 (J;XN)

RESONANCE CAVITIES
See CAVITY RESONATORS

RESOURCE RECOVERY FACILITIES
Management
How to run a community recycling center: a resource guide to low-technology recycling in Illinois, 8:54188 (R;US)

RESPIRABLE DUSTS
See DUSTS

RESPIRATORS
Regulations
Effects of added resistance to breathing in obstructed lung disease. Phase 1, 8:54975 (R;US)

RESPIRATORY EQUIPMENT
See RESPIRATORS

RESPONSE FUNCTIONS
Describing the response of a system to external action.
Least Square Fit
Index algorithm for forming approximation function in the least square method, 8:55336 (R;SU;In Russian)
Optimization
Index algorithm for forming approximation function in the least square method, 8:55336 (R;SU;In Russian)

RESUSPENSION
See PARTICLE RESUSPENSION

RETROFITTING
Boilers
Reclaiming lost capability in power plant coal conversions: an innovative, low-cost approach. Final report (Patented method of retrofitting coal boilers previously converted to oil or gas without derating), 8:53858 (R;US)
Environmental Impacts
Florida statewide coal-conversion study: coal-supply and transportation analysis, 8:53859 (R;US)

REVERSE-FIELD PINCH
Plasma Confinement
Velocity-space particle loss in field-reversed theta pinches, 8:55243 (R;US)

RHENIUM COMPLEXES
Chemical Reaction Yield
Bimetallic anionic formyl complexes: synthesis and properties, 8:54331 (J;US)
Regiospecific and stereospecific reactions of $Ph_3C^+ PF_6^-$ with rhenium alkyls (eta-C_5H_5)Re(NO)(PPh_3)(R). α- vs β-hydride abstraction, 8:54323 (J;US)
Chemical Reactions
Bimetallic anionic formyl complexes: synthesis and properties, 8:54331 (J;US)
Regiospecific and stereospecific reactions of $Ph_3C^+ PF_6^-$ with rhenium alkyls (eta-C_5H_5)Re(NO)(PPh_3)(R). α- vs β-hydride abstraction, 8:54323 (J;US)
Excitation
Bimetallic anionic formyl complexes: synthesis and properties, 8:54331 (J;US)
Isomerization
Regiospecific and stereospecific reactions of $Ph_3C^+ PF_6^-$ with rhenium alkyls (eta-C_5H_5)Re(NO)(PPh_3)(R). α- vs β-hydride abstraction, 8:54323 (J;US)
Photochemical Reactions
Photochemistry of mixed-metal bimetalic complexes containing pentacyanoferrate(II) or pentaammineruthenium(II) metal centers. Evidence for some intramolecular energy-transfer reactions, 8:54340 (J;US)
Photochemistry
Photochemistry of mixed-metal bimetalic complexes containing pentacyanoferrate(II) or pentaammineruthenium(II) metal centers. Evidence for some intramolecular energy-transfer reactions, 8:54340 (J;US)
Pyrolysis
Bimetallic anionic formyl complexes: synthesis and properties, 8:54331 (J;US)

Structural Chemical Analysis
Regiospecific and stereospecific reactions of $Ph_3C^+ PF_6^-$ with rhenium alkyls (eta-C_5H_5)Re(NO)(PPh_3)(R). α- vs β-hydride abstraction, 8:54323 (J;US)
Visible Spectra
Photochemistry of mixed-metal bimetalic complexes containing pentacyanoferrate(II) or pentaammineruthenium(II) metal centers. Evidence for some intramolecular energy-transfer reactions, 8:54340 (J;US)

RHENIUM COMPOUNDS
Chemical Reaction Yield
Bimetallic anionic formyl complexes: synthesis and properties, 8:54331 (J;US)

RHEOLOGY
Mathematical Models
Physical properties of SRC-I slurries under preheater conditions. Final report (300 to 728°K; 150, 1000, and 2500 psig), 8:53348 (R;US)

RHODIUM
Electron Spectroscopy
Role of d-electrons in chemisorption and metal/support interactions studied by electron spectroscopy. Progress report, January 15, 1983-January 14, 1984, 8:55112 (R;US)

RHODIUM BORIDES
Crystal Field
Magnetism and crystal fields in ternary superconductors (RE Rh_4B_4), 8:54288 (BA;US)

RHODIUM COMPLEXES
Excitation
Electron-transfer quenching vs. exciplex-mediated quenching of the low-lying excited states in phthalocyanines, 8:54315 (J;US)

RICE
Gene Mutations
Rice protein improvement through mutation breeding techniques, advance evaluations. Part of a coordinated programme on use of nuclear techniques for cereal grain protein improvement. Final report for the period 1 March 1980 - 31 December 1982, 8:55042 (R;XA)
Germination
Respiration of roots. Response to low O_2 stress. Final report, 8:54981 (R;US)
Plant Breeding
Rice protein improvement through mutation breeding techniques, advance evaluations. Part of a coordinated programme on use of nuclear techniques for cereal grain protein improvement. Final report for the period 1 March 1980 - 31 December 1982, 8:55042 (R;XA)
Plant Growth
Respiration of roots. Response to low O_2 stress. Final report, 8:54981 (R;US)
Proteins
Rice protein improvement through mutation breeding techniques, advance evaluations. Part of a coordinated programme on use of nuclear techniques for cereal grain protein improvement. Final report for the period 1 March 1980 - 31 December 1982, 8:55042 (R;XA)

RICHLAND NPR REACTOR
See N-REACTOR

RINGS (STORAGE)
See STORAGE RINGS

RISER CRACKING
See COAL LIQUEFACTION

RISK ASSESSMENT
Public perceptions of risk, 8:55025 (RA;US)
Calculation Methods
Methodologic assessment of radiation epidemiology studies, 8:55006 (RA;US)
Model or metaphor. More comments on the BEIR III report, 8:55028 (RA;US)
Ethics
Radiation risks and benefits: politics and morality, 8:55004 (RA;US)
Mathematical Models
Relative and absolute risk in epidemiology and health physics, 8:55023 (RA;US)
Public Opinion
Radiation risks and benefits: politics and morality, 8:55004 (RA;US)
Statistical Models
Some statistical considerations related to the estimation of cancer risk following exposure to ionizing radiation, 8:55007 (RA;US)

ROAD TRANSPORT
Computerized Simulation
DOE transportation programs: computerized techniques, 8:53579 (RA;US)
HIGHWAY, a transportation routing model: program description and users' manual, 8:53581 (R;US)
US Department of Energy sponsored techniques for computerzed transportation routing analysis, 8:53528 (RA;US)
Routing
HIGHWAY, a transportation routing model: program description and users' manual, 8:53581 (R;US)

ROADS
Construction
Stability of relocated stream channels. Final report, January 1978-December 1980, 8:54956 (R;US)
Environmental Effects
Incidence of heavy metals in street surface sediments: solubility and grain size studies, 8:54917 (J;NL)
Pipeline haul-road investigations north of the Brooks Range, 8:54941 (R;US)
Materials Recovery
Surface characteristics of roads resurfaced using the repave process. Final report, 8:54155 (R;US)
Recycling
Surface characteristics of roads resurfaced using the repave process. Final report, 8:54155 (R;US)

ROBINSON-2 REACTOR
Environmental Impacts
Draft environmental statement related to steam generator repair at H.B. Robinson Steam Electric Plant Unit No. 2, (Docket No. 50-261), 8:53876 (R;US)
Steam Generators
Draft environmental statement related to steam generator repair at H.B. Robinson Steam Electric Plant Unit No. 2, (Docket No. 50-261), 8:53876 (R;US)

ROCK SALT
See SALT DEPOSITS

ROCK-FLUID INTERACTIONS
Geochemical assessment of nuclear waste isolation. Report of activities during fiscal year 1982, 8:53649 (R;US)

ROCKS
Explosive Fracturing
Mechanics of fracture under high-rate stress loading, 8:55081 (R;US)

ROCKWELL FLASH HYDROLIEUEFACTION PROCESS
See CS-R PROCESS

ROCKY FLATS PLANT
Personnel Dosimetry
Improvement in radiation exposure measurements at Rocky Flats over the past 30 years and its possible impact on epidemiological studies, 8:54922 (RA;US)

ROCKY MOUNTAIN REGION
See FEDERAL REGION VIII

RODS (CONTROL)
See CONTROL ELEMENTS

ROENTGEN EQUIVALENT MAN
See DOSE EQUIVALENTS

ROOFS
Passive Solar Heating Systems
Modular roofing component for collecting solar radiation, 8:53814 (P;FR;In French)

ROOT ABSORPTION
Mathematical Models
Heavy water tracing of soil-water transfers under irrigation. 8:54964 (J;US)
Research Programs
Root activity, 8:54996 (RA;XA)

ROOTS
Mycoses
Water relations of mycorrhiza, 8:54995 (RA;XA)
Tracer Techniques
Studies using ^{32}P to determine the distribution and activity patterns of the oil palm root system in Nigeria, 8:54993 (RA;XA)
ROSENBLUM COUNTERS
See SPARK COUNTERS
ROTARY DRILLS
Angular Velocity
Development of turbodrill tachometer. Final report, 8:53430 (R;US)
ROTARY ENGINES
Performance Testing
Shakedown and preliminary calibration tests for the fuel engine evaluation system using the Km914A Sachs Rotary Combustion Engine. Technical note, 8:54196 (R;US)
Spark Ignition Engines
Shakedown and preliminary calibration tests for the fuel engine evaluation system using the Km914A Sachs Rotary Combustion Engine. Technical note, 8:54196 (R;US)
ROTORS
See also DARRIEUS ROTORS
Ultrasonic Testing
Progress on ultrasonic flaw sizing in turbine-engine rotor components: bore and web geometries, 8:54534 (R;US)
RUBBERS
Fracture Properties
Fracture toughness of polybutadiene at cryogenic temperatures. Technical report, 8:54266 (R;US)
RUBIDIUM
Equations of State
Piston-displacement equations of state for sodium, potassium, and rubidium metals to 20 kbar from 300 K to 4 K, 8:54275 (R;US)
RUBIDIUM 97
Beta-Minus Decay
Calculation of nuclear properties far from the line of β stability, 8:55189 (R;US)
RUBIDIUM CARBIDES
Phonons
Phonon dispersion of transverse basal-plane modes in alkali-graphite compounds, 8:54253 (R;US)
RULISON EVENT
Seismographs
Magnitude/yield variability in the western United States: analysis of the Rulison/Gasbuggy anomaly. Final report 1 Dec 81-30 Nov 82, 8:54869 (R;US)
RUTHENIUM COMPLEXES
Electronic Structure
Concerning the electronic structure of the ions $M(bpy)_3^{2+}$ (M = Fe, Ru, Os; bpy = 2,2'-bipyridine), 8:54330 (J;US)
X-ray absorption spectra of ruthenium L edges in $Ru(NH_3)_6Cl_3$, 8:54317 (J;US)
Excitation
Concerning the electronic structure of the ions $M(bpy)_3^{2+}$ (M = Fe, Ru, Os; bpy = 2,2'-bipyridine), 8:54330 (J;US)
Electron-transfer quenching vs. exciplex-mediated quenching of the low-lying excited states in phthalocyanines, 8:54315 (J;US)
Photochemical Reactions
Photochemistry of mixed-metal bimetalic complexes containing pentacyanoferrate(II) or pentaammineruthenium(II) metal centers. Evidence for some intramolecular energy-transfer reactions, 8:54340 (J;US)
Photochemistry
Photochemistry of mixed-metal bimetalic complexes containing pentacyanoferrate(II) or pentaammineruthenium(II) metal centers. Evidence for some intramolecular energy-transfer reactions, 8:54340 (J;US)
Visible Spectra
Photochemistry of mixed-metal bimetalic complexes containing pentacyanoferrate(II) or pentaammineruthenium(II) metal centers. Evidence for some intramolecular energy-transfer reactions, 8:54340 (J;US)
X-Ray Spectra
X-ray absorption spectra of ruthenium L edges in $Ru(NH_3)_6Cl_3$, 8:54317 (J;US)
RUTILE
Surface Properties
X-ray photoelectron spectroscopy (XPS) studies of hydrogen reduced rutile (TiO/sub 2-x/) surfaces, 8:54260 (J;NL)
RWE-BAYERNWERK-B REACTOR
See GUNDREMMINGEN-2 REACTOR

S

SACLAY (CEA)
See CEA SACLAY
SAFEGUARDS
Evaluation
SAFE users manual. Volume 4. Computer programs (Safeguards Automated Facility Evaluation (SAFE)), 8:53718 (R;US)
SAFETY ENGINEERING
Research Programs
Bureau of Mines coal mining, health and safety, research and development. 1975 annual report and achievements, 8:53404 (R;US)
SAFETY (NUCLEAR)
See RADIATION PROTECTION
SAFETY (REACTOR)
See REACTOR SAFETY
SAFETY RODS
See SCRAM RODS
SALINE ZONE
See OIL SHALES
SALT DEPOSITS
Topical reports on Louisiana salt domes, 8:53664 (R;US)
Age Estimation
Palynological studies Vacherie and Rayburn's domes North Louisiana salt dome basin, 8:53665 (RA;US)
Boreholes
Permian potentiometric analysis, 8:53676 (R;US)
Computerized Simulation
Two-dimensional analysis of joint and fault plane stability around a radioactive waste repository in bedded salt, 8:53659 (R;US)
Fractures
Preliminary assessment of the healing of fractures in salt, 8:53662 (R;US)
Geochemistry
Petrographic and geochemical characteristics of the Cypress Creek salt core, 8:53663 (R;US)
Geology
Overview of the regional geology of the Paradox Basin Study Region, 8:53658 (R;US)
Ground Uplift
Analysis of tiltmeter monitoring of Northern Louisiana salt domes, 8:53666 (RA;US)
Hydrology
Surface hydrology study, 8:53669 (RA;US)
Petrography
Petrographic and geochemical characteristics of the Cypress Creek salt core, 8:53663 (R;US)
Rock Mechanics
Preliminary investigation of the structural influence of entry-entry intersections and inhomogeneous initial-stress fields on repository disposal rooms, 8:53660 (R;US)
Stability
Precise leveling, Vacherie salt dome, Webster and Bienville Parishes, Louisiana, 8:53667 (RA;US)
Stress Analysis
Preliminary investigation of the structural influence of entry-entry intersections and inhomogeneous initial-stress fields on repository disposal rooms, 8:53660 (R;US)

SAMPLING
Statistics
Los Angeles field modeling and measurement study - 1976 (first year). Final report, 8:54883 (R;US)
SANDIA LABORATORIES
Radioactive Materials
Packaging test capabilities of the SNL aerial cable facility, 8:54422 (RA;US)
Test Facilities
Packaging test facilities at Sandia National Laboratories, 8:54401 (RA;US)
SANDSTONES
Oil Saturation
Assessment of gamma-inject logging techniques for the determination of residual oil saturation. Final report (Natural gamma background is first logged then radioactive fluids are injected into depleted reservoirs and the gamma signal returning to the borehole is measured), 8:53431 (R;US)
Permeability
Development of an improved method for the analysis of pressure-core samples. Final report, 8:53432 (R;US)
Porosity
Development of an improved method for the analysis of preasure-core samples. Final report, 8:53432 (R;US)
Service Life
Durability of marker materials for nuclear waste isolation sites, 8:53670 (R;US)
SANITARY LANDFILLS
Management
Hazardous waste landfill research, 8:54910 (R;US)
SAPPHIRE
Dislocations
Climb dissociation of <1010> dislocations in sapphire (α-Al_2O_3), 8:54264 (J;GB)
SARCOMAS
See also OSTEOSARCOMAS
Radioinduction
Epidemiological studies of German patients injected with Ra-224, 8:55015 (RA;US)
SATURN PLANET
Planetary Magnetospheres
Absorption of energetic protons by Saturn's ring g. Progress report for FY83, 8:55085 (R;US)
Radiation Belts
Absorption of energetic protons by Saturn's ring g. Progress report for FY83, 8:55085 (R;US)
SAVANNAH RIVER PLANT
Radioactive Effluents
Plutonium contents and fluxes in a soybean crop ecosystem near a nuclear fuel chemical separations facility, 8:54931 (J;US)
Storage Facilities
Decommissioning alternatives for Savannah River Plant high-level waste tank 16, 8:53631 (RA;US)
SCALERS
Counting Rates
Unit of high-speed decimal scaler with computer indication and control, 8:54691 (R;SU;In Russian)
Specifications
Unit of high-speed decimal scaler with computer indication and control, 8:54691 (R;SU;In Russian)
SCALING UNITS
See SCALERS
SCANDINAVIA
See also NORWAY
SWEDEN
Radioactive Wastes
Nordic study on reactor waste, 8:53697 (RA;US)
SCANNING MEASURING PROJECTORS
Image Processing
Assembly and copying of the results of multiview events from the RISK chamber measured on AELT-2/160 device, 8:54703 (R;SU;In Russian)
SCHOOL BUILDINGS
Energy Management
Energy-conservation program: University of Hawaii at Manoa, 8:54077 (RA;US)
Waste Heat Utilization
Cogeneration project - Clark University. Integrated Community Energy System, 8:54186 (R;US)
SCHWINGER SOURCE THEORY
Feynman Diagram
Diagram summation method in Schwinger source theory, 8:55159 (R;SU)
SCINTILLATION CHAMBERS
See SCINTILLATION COUNTERS
SCINTILLATION COUNTERS
See also LIQUID SCINTILLATION DETECTORS
SOLID SCINTILLATION DETECTORS
Photodiodes
Scintillator calorimetry with vacuum photodiode readout, 8:54718 (RA;US)
SCINTILLATION DETECTORS
See SCINTILLATION COUNTERS
SCRAM RODS
Switches
Magnetic switch for reactor control rod (LMFBR), 8:53950 (P;US)
SEA URCHINS
Population Dynamics
Longevity, life history, and relative body wall size in sea urchins, 8:54980 (J;US)
Size
Longevity, life history, and relative body wall size in sea urchins, 8:54980 (J;US)
SEALING MATERIALS
Evaluation
Evaluation of clays and clay minerals for application to repository sealing, 8:53672 (R;US)
Performance
Performance assessment of a shaft seals system in a HLW repository in the Gibson Dome area, 8:53673 (R;US)
SEALS
See also GASKETS
Design
Factors influencing the design and assessment of elastomer seals for nuclear fuel transport flasks, 8:54411 (RA;US)
Failures
Potential for containment leak paths through electrical penetration assemblies under severe accident conditions (PWR;BWR), 8:54030 (R;US)
Leak Testing
Fundamental studies on the performance of O-ring seal for cask, 8:54412 (RA;US)
Helium/solid powder O-ring leakage correlation experiments, 8:54410 (RA;US)
Performance
Fundamental studies on the performance of O-ring seal for cask, 8:54412 (RA;US)
Performance Testing
Correlation between measured gas leaks and possible loss of contents from radioactive materials packagings, 8:54409 (RA;US)
Factors influencing the design and assessment of elastomer seals for nuclear fuel transport flasks, 8:54411 (RA;US)
Metallic seal testing, 8:54414 (RA;US)
Potential for containment leak paths through electrical penetration assemblies under severe accident conditions (PWR;BWR), 8:54030 (R;US)
Permeability
In-situ permeation tests of elastomeric O-ring seals, 8:54413 (RA;US)
Testing
Program for the improvement of downhole drilling motor bearings and seals. Phase V. Final report, 8:53836 (R;US)
SEAWATER
Chemical Analysis
Development of preconcentration techniques for the determination of cadmium, copper, lead and zinc in sea water in conjunction with flame atomic absorption spectrophotometry, 8:54298 (R;TH)

Radiation Monitoring
Strontium-90 and cesium-137 in sea water; April, 1978 to March, 1979. Radioactivity survey related with environmental and dietary materials, 8:54936 (RA;JP)
Radioactivity
Strontium-90 and cesium-137 in sea water; April, 1978 to March, 1979. Radioactivity survey related with environmental and dietary materials, 8:54936 (RA;JP)

SEBACEOUS GLANDS
See SKIN

SECONDARY BATTERIES
See ELECTRIC BATTERIES

SEDIMENTS
Age Estimation
Dating of lake sediments by determination of the polonium-210 (lead-210) content, 8:55083 (R;AT;In German)
Radiation Monitoring
Strontium-90 and cesium-137 in marine sediment; April, 1978 to March, 1979. Radioactivity survey related with environmental and dietary materials, 8:54934 (RA;JP)
Radioactivity
Strontium-90 and cesium-137 in marine sediment; April, 1978 to March, 1979. Radioactivity survey related with environmental and dietary materials, 8:54934 (RA;JP)
Th-230/Th-232 sedimentation rates and the natural radiation background along the western coast of Israel. Final report for the period 15 December 1977 - 31 October 1981, 8:54953 (R;XA)
Radionuclide Migration
Investigation of the speciation of radionuclides in sediments and soils, 8:54920 (RA;AU)
Solvent Properties
Dissolution characteristics of Pu-contaminated soils and sediments in lung serum simulant solution, 8:55063 (J;GB)

SEISMIC EFFECTS
Risk Assessment
Seismic Safety Margins Research Programs. Assessment of potential increases in risk due to degradation of steam generator and reactor coolant pump supports (PWR), 8:54032 (R;US)

SEISMIC SOURCES
Design
Down-hole periodic seismic generator, 8:54782 (P;US)

SEISMIC WAVES
Attenuation
Attenuation of seismic waves at regional distances. Final technical report 1 Oct 78-30 Sep 82, 8:54872 (R;US)

SELENIDES
See also ZINC SELENIDES
Crystal-Phase Transformations
Electronically induced phase transformations. Annual report 1 Oct 81-30 Sep 82, 8:54270 (R;US)

SELENIUM
Activation Analysis
Elemental composition of human and animal milk. A review. A report prepared under the auspices of the IAEA in collaboration with the WHO, 8:54983 (R;XA)

SELENIUM 77 TARGET
Argon 40 Reactions
Calculation of fusion cross sections, 8:55175 (R;DD;In German)

SEMICONDUCTOR COUNTERS
See SEMICONDUCTOR DETECTORS

SEMICONDUCTOR DETECTORS
See also SI SEMICONDUCTOR DETECTORS
SURFACE BARRIER DETECTORS
Response Functions
Cadmium telluride detectors for gamma dose-rate meters, 8:54645 (R;US)

SEMICONDUCTOR DEVICES
See also SEMICONDUCTOR DIODES
SEMICONDUCTOR LASERS
SEMICONDUCTOR RECTIFIERS
Annealing
Semiconductor processing with excimer lasers, 8:53764 (R;US)
Fabrication
Semiconductor processing with excimer lasers, 8:53764 (R;US)

SEMICONDUCTOR DIODES
See also LIGHT EMITTING DIODES
Encapsulation
Photovoltaic-module bypass-diode encapsulation. Annual report, 8:53777 (R;US)
Physical Radiation Effects
Total-dose radiation-effects data for semiconductor devices. Vol. 1, 8:54759 (R;US)

SEMICONDUCTOR JUNCTIONS
Current Density
I-V curves of superconducting microconstrictions. Technical report, 8:55219 (R;US)

SEMICONDUCTOR LASERS
Excitons
Exciton-laser amplifier. Interim technical report, 8:54508 (R;US)
Nonlinear Optics
Non-linear optical interactions in semiconductors. Final report 1 Apr 79-31 Mar 83, 8:54507 (R;US)
Tuning
Non-linear optical interactions in semiconductors. Final report 1 Apr 79-31 Mar 83, 8:54507 (R;US)

SEMICONDUCTOR MATERIALS
If possible index also the specific compounds.
Annealing
Semiconductor processing with excimer lasers, 8:53764 (R;US)
Fabrication
Semiconductor processing with excimer lasers, 8:53764 (R;US)

SEMICONDUCTOR RECTIFIERS
Physical Radiation Effects
Total-dose radiation-effects data for semiconductor devices. Vol. 1, 8:54759 (R;US)

SENIOR CENTERS
See PUBLIC BUILDINGS

SERVICE WATER SYSTEMS
See AUXILIARY WATER SYSTEMS

SHALE OIL
Refining
Refining to high yields of jet fuel from shale oil. Final report, 8:53460 (R;US)

SHAPED CHARGES
Prior to August 1979 CHEMICAL EXPLOSIVES and SHAPE were used.
Detonation Waves
Inverse multi-streak-technique, 8:54843 (RA;US)

SHEATHS (FUEL)
See FUEL CANS

SHELLS (CONTAINMENT)
See CONTAINMENT SHELLS

SHELTERS
Research on upgrading structures for host and risk area shelters, phase II. Final report, 8:54373 (R;US)

SHIELDING
Design
US INTOR radiation-shield design, 8:55262 (R;US)

SHIPMENT
See TRANSPORT

SHIPPINGPORT PRESSURIZED WATER REACTOR
See SHIPPINGPORT REACTOR

SHIPPINGPORT REACTOR
Reactor Decommissioning
Engineering and planning for the Shippingport Station Decommissioning Project, 8:54004 (RA;US)
Reactor Maintenance
Quarterly operating report, Second quarter 1983, 8:53873 (R;US)

SHIPS
See also NUCLEAR SHIPS
Design
Notes on the design of ships used in the international transport of irradiated nuclear fuel, 8:53558 (RA;US)
Energy Conservation
Technical review, volume 19, number 3, serial number 55, October 1982 (Mitsubishi Heavy Industries), 8:54168 (R;US)

SHOCK ABSORBERS
Design
Analysis method for the design of transport packagings shock absorbing end covers, 8:54468 (RA;US)
Impact limiter design methodology, 8:54469 (RA;US)
Impact Tests
Analysis of the behavior under impact loads of a shell-type shock absorber for LWR spent fuel transport packaging, 8:54467 (RA;US)
Development of a toroidal shell-type shock absorber for an irradiated fuel shipping cask, 8:54466 (RA;US)
Materials Testing
Shock response of flexible polyurethane foams, 8:54470 (RA;US)
Performance Testing
Invesigations on shock absorbers for Type B packagings, 8:54465 (RA;US)
SHOREHAM REACTOR
Reactor Licensing
Safety-evaluation report related to the operation of Shoreham Nuclear Power Station, Unit No. 1 (Docket No. 50-322) , 8:54025 (R;US)
Reactor Safety
Safety-evaluation report related to the operation of Shoreham Nuclear Power Station, Unit No. 1 (Docket No. 50-322) , 8:54025 (R;US)
SHOTFIRING
See EXPLOSIVE FRACTURING
SHOWER COUNTERS
Detects high energy gamma radiation or high energy particles on basis of cascade showers in layered absorbers.
Calorimetric physics in the presence of multiple events, 8:54729 (RA;US)
Results from the Soudan 1 detector, 8:55124 (RA;US)
Review of the status of proton decay experiments outside the USA, 8:54649 (RA;US)
Calibration
Hodoscope shower detector calibration by the π^0(eta^0)$\rightarrow 2\gamma$ decay, 8:54682 (R;SU;In Russian)
Design
Design study for a fine-grained multi-kiloton detector for nucleon decay and neutrino studies, 8:54648 (RA;US)
Geiger projection calorimeter, 8:54658 (RA;US)
Drift Chambers
Electronic read-out system for the drift chambers of a neutrino calorimeter, 8:54679 (R;SU;In Russian)
Flash Tubes
Test of a flash chamber calorimeter as a nucleon decay detector, 8:54657 (RA;US)
Geiger-Mueller Counters
Geiger projection calorimeter, 8:54658 (RA;US)
Hodoscopes
Hodoscope shower detector calibration by the π^0(eta^0)$\rightarrow 2\gamma$ decay, 8:54682 (R;SU;In Russian)
Operation
Search for hadron jets and large transverse momentum electrons at the SPS anti p p collider, 8:55140 (RA;US)
Performance Testing
Test of a flash chamber calorimeter as a nucleon decay detector, 8:54657 (RA;US)
Phosphors
Measurement of the response of an SCG1-C scintillation glass shower detector to 2-17.5 GeV positrons, 8:54719 (RA;US)
Scintillators and waveshifters for fast scintillator-WSB calorimetry, 8:54717 (RA;US)
Pulse Pileup
Monte Carlo simulation of the effect of pileup, 8:54728 (RA;US)
SI SEMICONDUCTOR DETECTORS
Energy Resolution
Use of solid state detectors for spectrometry of conversion electrons emitted in the decay of lead-210, 8:54667 (RA;AU)
SIALON
See ALUMINIUM OXIDES
SILICON NITRIDES
SILANES
Chemical Bonds
Amorphous silicon-carbon films, 8:54274 (R;US)
Chemical Reactions
Solid-state NMR studies of the reactions of silica surfaces with polyfunctional chloromethylsilanes and ethoxymethylsilanes, 8:54324 (J;US)
Decomposition
Preliminary study of a radiantly heated fluidized bed for the production of high-purity silicon, 8:53776 (R;US)
Impurities
Effects of monochlorosilane on the properties of plasma deposited hydrogenated amorphous silicon, 8:54290 (J;US)
Optical Properties
Amorphous silicon-carbon films, 8:54274 (R;US)
Structural Chemical Analysis
Solid-state NMR studies of the reactions of silica surfaces with polyfunctional chloromethylsilanes and ethoxymethylsilanes, 8:54324 (J;US)
SILICA
Catalytic Effects
Experimental studies on the control of hydrocarbons emission from a gasifier. Final report, September 1981-February 1983, 8:53337 (R;US)
Chemical Reactions
Solid-state NMR studies of the reactions of silica surfaces with polyfunctional chloromethylsilanes and ethoxymethylsilanes, 8:54324 (J;US)
Microstructure
Effects of porosity and surface area of octadecyl-derivatized silica on fractionations of oligomers of 800 MW polystyrene, 8:54336 (J;US)
Porosity
Effects of porosity and surface area of octadecyl-derivatized silica on fractionations of oligomers of 800 MW polystyrene, 8:54336 (J;US)
Structural Chemical Analysis
Solid-state NMR studies of the reactions of silica surfaces with polyfunctional chloromethylsilanes and ethoxymethylsilanes, 8:54324 (J;US)
SILICATES
See also GARNETS
Radiation Effects
Electron radiation damage in silicate glasses, 8:54280 (RA;US)
SILICON
Activation Analysis
Elemental composition of human and animal milk. A review. A report prepared under the auspices of the IAEA in collaboration with the WHO, 8:54983 (R;XA)
Electron Collisions
Electron scattering from silicon 30. Master's thesis, 8:54269 (R;US)
Electronic Structure
Electronic states of (2 x 1) and (1 x 1) (111) surfaces of Ge, Si diamond, GaAs and Ge on Si, 8:54286 (J;NL)
Ion Implantation
Characterization of excimer laser annealing of ion implanted Si, 8:54283 (J;US)
Development of morphological instability and formation of cells in silicon alloys during pulsed laser irradiation, 8:54289 (J;NL)
Phonons
Phonon density of states of amorphous silicon, 8:54277 (R;US)
Physical Radiation Effects
Electron scattering from silicon 30. Master's thesis, 8:54269 (R;US)
In-situ high resolution observation of electron irradiation defects in Si, 8:54279 (RA;US)
Production
Preliminary study of a radiantly heated fluidized bed for the production of high-purity silicon, 8:53776 (R;US)
Recrystallization
Zone-melting recrystallization for solar cells. Annual progress report, September 1, 1982-August 31, 1983, 8:53771 (R;US)
Zone Melting
Zone-melting recrystallization for solar cells. Annual progress report, September 1, 1982-August 31, 1983, 8:53771 (R;US)

SILICON 28 TARGET
Beryllium 9 Reactions
Fusion of heavy ions in an interaction potential model, 8:55168 (R;PL;In Polish)
Carbon 12 Reactions
Fusion of heavy ions in an interaction potential model, 8:55168 (R;PL;In Polish)
Lithium 6 Reactions
Fusion of heavy ions in an interaction potential model, 8:55168 (R;PL;In Polish)
SILICON CARBIDES
Chemical Bonds
Amorphous silicon-carbon films, 8:54274 (R;US)
Optical Properties
Amorphous silicon-carbon films, 8:54274 (R;US)
SILICON HYDRIDES
See SILANES
SILICON NITRIDES
Physical Radiation Effects
Radiation damage in ceramics: the influence of grain boundaries, 8:54258 (RA;US)
SILICON OXIDES
See also SILICA
Structural Chemical Analysis
Additional observations on the ferric ion (Fe^{3+}) content of melt-grown fayalite (Fe_2SiO_4), 8:54287 (J;US)
SILICON SEMICONDUCTOR DETECTORS
See SI SEMICONDUCTOR DETECTORS
SILICON SOLAR CELLS
Annealing
Semiconductor processing with excimer lasers, 8:53764 (R;US)
Design
Compensated amorphous-silicon solar cell, 8:53787 (P;US)
Zone-melting recrystallization for solar cells. Annual progress report, September 1, 1982-August 31, 1983, 8:53771 (R;US)
Fabrication
Semiconductor processing with excimer lasers, 8:53764 (R;US)
Zone-melting recrystallization for solar cells. Annual progress report, September 1, 1982-August 31, 1983, 8:53771 (R;US)
Testing
Zone-melting recrystallization for solar cells. Annual progress report, September 1, 1982-August 31, 1983, 8:53771 (R;US)
SILICOSIS
See PNEUMOCONIOSES
SILVER
Electroplating
Conditions for dropwise condensation on electroplated gold. Final report, February 15, 1980-August 14, 1983, 8:54209 (R;US)
SIMS
See ION MICROPROBE ANALYSIS
MASS SPECTROSCOPY
SINE GENERATORS
See FUNCTION GENERATORS
SINTERING
Porosity
Mechanisms of elevated-temperature rupture in single-phase ceramics. Progress report, February 1, 1983-January 31, 1984, 8:54254 (R;US)
SIOUX FALLS PATHFINDER REACTOR
See PATHFINDER REACTOR
SKELETAL DISEASES
See also OSTEOSARCOMAS
Pathology
Whole-body and part-body turnover of ^{85}Sr in Paget's disease, 8:55055 (J;GB)
SKELETON
Calcium 47
Studies of the calcium metabolism of subjects with renal dysfunction, 8:54965 (RA;AU)
Radionuclide Kinetics
Studies of the calcium metabolism of subjects with renal dysfunction, 8:54965 (RA;AU)
SKIN
Biological Radiation Effects
Effects of uranium compounds on skin. Final report for the period 1 July 1980 - 31 October 1982, 8:55043 (R;XA)
Radiation Doses
Skin dose and response for the head and neck in patients irradiated with x-ray for tinea capitis: implications for environmental radioactivity, 8:55012 (RA;US)
SLOT OVENS
See COKE OVENS
SLUDGES
Leachates
Coal combustion waste leachate scaling. Final report, July 1981-June 1982, 8:53388 (R;US)
SLURRIES
See also FUEL SLURRIES
Density
Physical properties of SRC-I slurries under preheater conditions. Final report (300 to 728°K; 150, 1000, and 2500 psig), 8:53348 (R;US)
Rheology
Physical properties of SRC-I slurries under preheater conditions. Final report (300 to 728°K; 150, 1000, and 2500 psig), 8:53348 (R;US)
SLURRIES (FUEL)
See FUEL SLURRIES
SMELTING
Acoustic Testing
Sonic resonator control and method for determining component concentration in multiple-component liquid, 8:54772 (P;US)
Process Control
Sonic resonator control and method for determining component concentration in multiple-component liquid, 8:54772 (P;US)
SMP DEVICES
See SCANNING MEASURING PROJECTORS
SOCIOLOGY
Quest for ultimate reality and meaning: a scientist's view, 8:54057 (R;US)
SODA ASH
See SODIUM CARBONATES
SODIUM
Activation Analysis
Elemental composition of human and animal milk. A review. A report prepared under the auspices of the IAEA in collaboration with the WHO, 8:54983 (R;XA)
Boiling Detection
Current status on the development of sodium boiling detection system in Japan, 8:53946 (R;JP)
Simulation study of neutronic and acoustic methods of boiling detection, 8:53948 (R;JP)
Transmission experiment by the simulated LMFBR model and propagation analysis of acoustic signals, 8:53947 (R;JP)
Equations of State
Piston-displacement equations of state for sodium, potassium, and rubidium metals to 20 kbar from 300 K to 4 K, 8:54275 (R;US)
Thermal Diffusion
Thermodiffusional transport in pelagic clay: implications for nuclear waste disposal in geological media, 8:53683 (J;US)
SODIUM 22 TARGET
Neutron Reactions
Study on the $^{22}Na(n,p)^{22}Ne$ reaction at the neutron energy up to 1000 eV, 8:55178 (R;SU;In Russian)
SODIUM CARBONATES
Electrochemistry
Electrochemical studies of molten sodium carbonate, 8:54337 (J;US)
Pyrolysis
Electrochemical studies of molten sodium carbonate, 8:54337 (J;US)
SODIUM CHLORIDES
Equations of State
Equations of state for the alkali metals, with generalizations to NaCl, 8:54276 (R;US)
SODIUM HYDROXIDES
Corrosive Effects
Characterization of Alloy 600 surfaces after exposure to a caustic environment, 8:54208 (R;US)

SODIUM IODIDE DETECTORS
See NAI DETECTORS
SODIUM MINERALS
See MINERALS
SODIUM REACTOR EXPERIMENT
See SRE REACTOR
SOILS
Gas Analysis
A timesaving technique for measuring respiration rates in incubated soil samples, 8:54913 (J;US)
Nitrates
Nitrate distribution in Mojave Desert soils, 8:54914 (J;US)
Radiation Monitoring
Intercomparison of some environmental monitoring methods applied at nuclear power plants in Czechoslovakia (Bohunice) and in Hungary (Paks), 8:54925 (R;HU)
Strontium-90 and cesium-137 in soil: April 1978 to March 1979. Radioactivity survey related with environmental and dietary materials, 8:54906 (RA;JP)
Radioactivity
Strontium-90 and cesium-137 in soil: April 1978 to March 1979. Radioactivity survey related with environmental and dietary materials, 8:54906 (RA;JP)
Radiochemical Analysis
α-β-γ spectrometer for directing decontamination of soils, 8:54747 (J;GB)
Radionuclide Migration
Investigation of the speciation of radionuclides in sediments and soils, 8:54920 (RA;AU)
Survey of statistical and sampling needs for environmental monitoring of commercial low-level radioactive waste disposal facilities, 8:53678 (R;US)
The relative importance of uptake and surface adherence in determining the radionuclide contents of subterranean crops, 8:54929 (J;GB)
Respiration
A timesaving technique for measuring respiration rates in incubated soil samples, 8:54913 (J;US)
Solvent Properties
Dissolution characteristics of Pu-contaminated soils and sediments in lung serum simulant solution, 8:55063 (J;GB)
SOLAR ABSORBERS
Manufacturing
Process for manufacturing a selective absorber for solar panels and selective absorber obtained, 8:53824 (P;FR;In French)
Spectrally Selective Surfaces
Process for manufacturing a selective absorber for solar panels and selective absorber obtained, 8:53824 (P;FR;In French)
SOLAR AIR CONDITIONING
Dehumidifiers
Study and evaluation of the latent cooling potential of chemical de-humidifiers. Final report, 8:53803 (R;US)
SOLAR BATTERIES
See SOLAR CELL ARRAYS
SOLAR CELL ARRAYS
Encapsulation
Photovoltaic-module bypass-diode encapsulation. Annual report, 8:53777 (R;US)
Semiconductor Diodes
Photovoltaic-module bypass-diode encapsulation. Annual report, 8:53777 (R;US)
SOLAR CELL RECEIVERS
See SOLAR RECEIVERS
SOLAR CELLS
See also CADMIUM SULFIDE SOLAR CELLS
SILICON SOLAR CELLS
Photovoltaic conversion of solar energy, 8:53780 (R;US)
Destructive Testing
Investigation of accelerated stress factors and failure/degradation mechanisms in terrestrial solar cells. Fourth annual report, 8:53775 (R;US)
Efficiency
Effects of monochlorosilane on the properties of plasma deposited hydrogenated amorphous silicon, 8:54290 (J;US)
Reviews
Advances in photovoltaics R and D: an overview, 8:53782 (R;US)
SOLAR COLLECTORS
See also CONCENTRATING COLLECTORS
FLAT PLATE COLLECTORS
SOLAR PONDS
Design
Tubular cell solar collector, 8:53821 (P;FR;In French)
SOLAR DISTRICT HEATING
Solar Ponds
Feasibility of solar pond heating for northern cold climates, 8:53809 (R;US)
Radiation transmission measurements for solar ponds, 8:53810 (R;US)
SOLAR DOMESTIC WATER HEATING
See SOLAR WATER HEATING
SOLAR DRYERS
Construction
Drying wood with the sun: how to build a solar-heated firewood dryer, 8:53801 (R;US)
SOLAR ENERGY
Commercialization
Utility Applications and Synthetic Fuels and Chemicals Market Sector: workbook, 8:53778 (R;US)
Energy Accounting
Domestic potential of solar and other renewable energy sources. Supporting paper 6, 8:53760 (R;US)
Information Dissemination
Energy for Illinois. Final report, 8:54192 (R;US)
Marketing Research
Domestic potential of solar and other renewable energy sources. Supporting paper 6, 8:53760 (R;US)
Program Management
DOE renewable energy program, 8:54110 (R;US)
Property Rights
Resource rights: geothermal and solar energy, 8:54109 (RA;US)
Tax Credits
Tax credits claimed by Hawaii residents, 8:53762 (RA;US)
SOLAR ENERGY CONVERSION
See also OCEAN THERMAL ENERGY CONVERSION
SOLAR THERMAL CONVERSION
Photochemical Reactions
Electrochemical characterization of p-type semiconducting tungsten disulfide photocathodes: efficient photoreduction processes at semiconductor/liquid electrolyte interfaces, 8:53784 (J;US)
SOLAR FLARES
Forecasting
Studies of solar flares and erupting filaments. Final report 1 Jul 76-30 Sep 81, 8:55087 (R;US)
SOLAR HEATING SYSTEMS
See also PASSIVE SOLAR HEATING SYSTEMS
Computerized Control Systems
Presentation of the software for central control system I of the solar pilot test facilities. volume III. Final report, 8:53806 (R;US)
Design
United kingdom solar pilot test facility. the design, construction and first phase of operation. Final report, 8:53807 (R;US)
Operation
United kingdom solar pilot test facility. the design, construction and first phase of operation. Final report, 8:53807 (R;US)
Research Programs
Pilot test facility. phase I. Final report, 8:53805 (R;US)
Valves
Natural regulating valve, 8:53813 (P;FR;In French)
SOLAR NEUTRINOS
Prior to July, 1975 information was indexed to NEUTRINOS.
Radiation Flux
Proposed geological solar neutrino flux measurement, 8:55093 (RA;US)
SOLAR PONDS
Feasibility of solar pond heating for northern cold climates, 8:53809 (R;US)

Design
Conceptual design of a 20-acre salt-gradient solar pond system for electric power production at Truscott, Texas, 8:53792 (R;US)
Economic Analysis
Potential for salt-gradient solar ponds in New York State. Final report, 8:53808 (R;US)
Economics
Hawaii solar pond project, 8:53817 (RA;US)
Light Transmission
Radiation transmission measurements for solar ponds, 8:53810 (R;US)
Membranes
Gradient zone-boundary control in salt-gradient solar ponds, 8:53827 (P;US)
Performance
Radiation transmission measurements for solar ponds, 8:53810 (R;US)
Salinity Gradients
Gradient zone-boundary control in salt-gradient solar ponds, 8:53827 (P;US)
Technology Assessment
Hawaii solar pond project, 8:53817 (RA;US)

SOLAR RADIATION
Data Compilation
Commercial energy costs for SOLCOST data bank cities, Winter 1982-1983, 8:54105 (R;US)
Numerical Data
Studies on parameterization of global, diffuse and direct solar radiation. Final report, 8:53757 (R;US)
Reflection
Graphical method for determining interflected daylight in clear climates, 8:53758 (R;US)

SOLAR RECEIVERS
See also CAVITY RECEIVERS
Design
Solar heat receiver, 8:53826 (P;US)

SOLAR REPOWERING
Prior to October 1980 this concept was indexed to RETROFITTING.
Energy Analysis
Repowering with solar energy, 8:53791 (R;US)
Market
Repowering with solar energy, 8:53791 (R;US)

SOLAR SEA POWER PLANTS
See OCEAN THERMAL POWER PLANTS

SOLAR SPACE HEATING
Solar Ponds
Potential for salt-gradient solar ponds in New York State. Final report, 8:53808 (R;US)

SOLAR THERMAL CONVERSION
Use for overviews of solar thermal program.
Heat Transfer Fluids
Preliminary assessment of the use of heat transfer fluids for solar thermal energy systems. Final report May 81-Apr 82, 8:53763 (R;US)

SOLAR THERMAL POWER PLANTS
Solar Ponds
Conceptual design of a 20-acre salt-gradient solar pond system for electric power production at Truscott, Texas, 8:53792 (R;US)

SOLAR THERMAL RECEIVERS
See SOLAR RECEIVERS

SOLAR WATER HEATERS
Integral solar water heaters in low income housing: a preliminary report on a research and development project, 8:53802 (R;US)
Comparative Evaluations
Influence of residential solar water heaters on electric-utility peak demand, 8:53811 (R;US)
Energy Consumption
Influence of residential solar water heaters on electric-utility peak demand, 8:53811 (R;US)
Technology Assessment
Solar hot-water heaters, 8:53800 (RA;US)
Valves
Natural regulating valve, 8:53813 (P;FR;In French)

SOLAR WATER HEATING
Use for solar domestic water heating; not for process hot water.
Monitoring
Influence of residential solar water heaters on electric-utility peak demand, 8:53811 (R;US)

SOLAR WIND
Hydrodynamic Model
Magnetohydrodynamic modelling of interplanetary disturbances between the sun and earth. Environmental research papers, 8:55092 (R;US)
Variations
Project to develop an index of pc 3,4,5 geomagnetic pulsations and to study their control by solar wind parameters. Final report, 8:55100 (R;US)

SOLID SCINTILLATION DETECTORS
See also NAI DETECTORS
PLASTIC SCINTILLATION DETECTORS
Efficiency
Dynamic positron emission tomography in man using small bismuth germanate crystals, 8:54752 (BA;NL)
Reviews
Simultaneous spectral measurement of fast neutrons and rays with an organic scintillator, 8:54753 (TJ;US)
Sensitivity
Dynamic positron emission tomography in man using small bismuth germanate crystals, 8:54752 (BA;NL)
Spatial Resolution
Dynamic positron emission tomography in man using small bismuth germanate crystals, 8:54752 (BA;NL)

SOLID STATE LASERS
Optical Pumping
Recent development of high-power visible laser sources employing solid-state slab lasers and nonlinear harmonic conversion techniques. Technical information series, 8:54496 (R;US)
Performance
Recent development of high-power visible laser sources employing solid-state slab lasers and nonlinear harmonic conversion techniques. Technical information series, 8:54496 (R;US)

SOLID WASTES
See also TAILINGS
Chemical Analysis
Kinds and quantities of organic combustion products in solid and liquid wastes from a coal-fired power station, 8:53393 (R;US)

SOLIDIFICATION
Mathematics
Shortcoming of the explicit solution for the binary alloy solidification problem, 8:54248 (J;US)

SOLIDS
Inclusions
Ultrasonic 3-D reconstruction of inclusions in solids using the inverse Born algorithm, 8:54533 (R;US)

SOLUTIONS
For mathematical solutions see ANALYTICAL SOLUTION or NUMERICAL SOLUTION.
See also LEACHATES
PROCESS SOLUTIONS
Chemical Reactions
Rate constants for the decay and reactions of the lowest electronically excited singlet state of molecular oxygen in solution, 8:54343 (J;US)

SOLVENT-REFINED COAL PROCESS
See SRC PROCESS

SOLVENT-REFINING COAL PLANTS
See COAL PREPARATION PLANTS
SRC PROCESS

SOLVENTS
See also ORGANIC SOLVENTS
Chemical Reactions
Rate constants for the decay and reactions of the lowest electronically excited singlet state of molecular oxygen in solution, 8:54343 (J;US)

SOUTH AFRICA
Coal Industry
Metallurgical coal in the 1980's - facts and prospects, 8:53423 (R;US)
SOUTH KOREA
See REPUBLIC OF KOREA
SOVIET UNION
See USSR
SOYBEAN PLANT
See GLYCINE HISPIDA
SPACE HVAC SYSTEMS
Heating, ventilation, and air conditioning systems.
Energy Consumption
Control strategies for reducing heating, ventilating, and air conditioning (HVAC) energy consumption in single buildings. Final report Jan-Jun 82, 8:54127 (R;US)
SPAIN
Dry Storage
Development of a dry transport and storage cask for spent LWR fuel assemblies in Spain, 8:53584 (BA;XN)
SPARK CHAMBERS
See also PROJECTION SPARK CHAMBERS
STREAMER SPARK CHAMBERS
Energy Resolution
Proposal of new avalanche mode detector for high energy heavy ion and particle physics experiments, 8:54689 (R;JP;In Japanese)
Time Resolution
Proposal of new avalanche mode detector for high energy heavy ion and particle physics experiments, 8:54689 (R;JP;In Japanese)
SPARK COUNTERS
Electronic Equipment
Multi-channel spark counter for reading neutron dosemeters with plastic track detectors, 8:54744 (R;DD;In German)
SPEAR
Stanford positron-electron asymmetric ring.
Monitors
SLAC analog status monitor Mod II (Engineering Materials), 8:54635 (E;US)
SPECIFIC GRAVITY
See DENSITY
SPECIFIC VOLUME
See DENSITY
SPECIFIC WEIGHT
See DENSITY
SPECTRA (NEUTRON)
See NEUTRON SPECTRA
SPECTROCHEMISTRY
See EMISSION SPECTROSCOPY
SPECTROMETERS
See also ALPHA SPECTROMETERS
COSMIC RAY SPECTROMETERS
ELECTRON SPECTROMETERS
FISSION FRAGMENT SPECTROMETERS
HEAVY ION SPECTROMETERS
MAGNETIC SPECTROMETERS
MASS SPECTROMETERS
MULTIPARTICLE SPECTROMETERS
PROTON SPECTROMETERS
TIME-OF-FLIGHT SPECTROMETERS
Calibration
Efficiency calibration of low energy photon spectrometers, 8:54665 (RA;AU)
Design
α-β-γ spectrometer for directing decontamination of soils, 8:54747 (J;GB)
Electronic Equipment
One nanosecond resolution time-to-digital converter, 8:54669 (R;FR)
Operation
Experience of the axial field spectrometer at the CERN ISR, 8:54707 (RA;US)
Performance
α-β-γ spectrometer for directing decontamination of soils, 8:54747 (J;GB)
SPEED INDICATORS
See VELOCIMETERS

SPENT FUEL CASKS
Storage and transportation of spent fuel and high-level waste using dry storage casks, 8:53497 (RA;US)
Transport of fast breeder reactor spent fuel in gas-filled casks, 8:53560 (RA;US)
Accidents
Experimental determination of radionuclide release and transport from spent fuel exposed to cask fire environments, 8:53705 (RA;US)
Criticality
Criticality control of packagings loaded with nuclear spent fuel, 8:53562 (RA;US)
Safety analysis code systems for spent fuel cask in JINS, 8:54460 (RA;US)
Standard problem exercise to validate criticality codes for spent LWR fuel transport container calculations, 8:54462 (RA;US)
Standaridized analyses of nuclear shipping containers, 8:54461 (RA;US)
Decontamination
Hands-off technique for the internal decontamination of fuel transport flasks, 8:54455 (RA;US)
Deformation
Safety analysis code systems for spent fuel cask in JINS, 8:54460 (RA;US)
Degassing
Water radiolysis study: application to the transportation casks, 8:54386 (RA;US)
Demand
Shipping cask demand associated with US government storage of commercial spent fuel, 8:53530 (RA;US)
Design
Conceptual design of large spent fuel shipping casks for older PWR fuel, 8:54432 (RA;US)
Design and fabrication of 100-ton-class spent fuel shipping cask (100-ton cask), 8:54441 (RA;US)
Design of a transportation cask for irradiated CANDU fuel, 8:54430 (RA;US)
Development of a dry transport and storage cask for spent LWR fuel assemblies in Spain, 8:53584 (BA;XN)
Spent fuel dry-storage system for Trino Vercellese nuclear power plant, 8:53585 (BA;XN)
Super Phenix spent fuel storage cask, Castor SPX, 8:53494 (RA;US)
Thermal analysis for the design of a CANDU irradiated fuel transportation cask, 8:54436 (RA;US)
TN-12Y packaging for rail transport of irradiated fuel, 8:54433 (RA;US)
TN 1300 shipping/storage cask system for spent fuel, 8:53588 (BA;XN)
TN 1300 transport/storage cask system, 8:53496 (RA;US)
TN 17/3: a cask designed for the transport of irradiated fuel to a PIE facility, 8:54387 (RA;US)
Evaluation
TN cask capabilities for transport of extended burnup fuel assemblies, 8:54431 (RA;US)
Fabrication
Design and fabrication of 100-ton-class spent fuel shipping cask (100-ton cask), 8:54441 (RA;US)
Development of a dry transport and storage cask for spent LWR fuel assemblies in Spain, 8:53584 (BA;XN)
Thermal analysis of lead pour fabrication process for a spent fuel shipping cask, 8:54447 (RA;US)
TN 1300 cask casting process and material qualification, 8:54382 (RA;US)
Widely useful stainless steel forging B(U) packaging, 8:54418 (RA;US)
Feasibility Studies
Feasibility study for scaling ferritic shipping casks for drop-tests, 8:54428 (RA;US)
Fracture Mechanics
Application of linear-elastic fracture mechanics concepts to ferritic spent fuel shipping casks, 8:54379 (RA;US)
Heat Transfer
Heat dissipation by natural convection of circumferentially finned spent fuel transport casks, 8:54437 (RA;US)

Safety analysis code systems for spent fuel cask in JINS, 8:54460 (RA;US)
Impact Tests
Drop from the reactor building crane: an event covered by the 9-m drop test requirement, 8:54423 (RA;US)
Feasibility study for scaling ferritic shipping casks for drop-tests, 8:54428 (RA;US)
Study of the influence of target material on impact damage, 8:54425 (RA;US)
Inspection
Three years of experience and future prospects in maintenance and reinspection on LWR-irradiated fuel transport flasks, 8:54454 (RA;US)
Widely useful stainless steel forging B(U) packaging, 8:54418 (RA;US)
Leak Testing
Criteria for and proof of leaktightness concerning casks for dry transport and intermediate storage of spent LWR-fuel elements, 8:54408 (RA;US)
Licensing
SCALE: a modular code system for performing standardized computer analyses for licensing evaluation (Additions), 8:53720 (R;US)
SCALE: a modular code system for performing standardized computer analyses for licensing evaluation (Additions), 8:53721 (R;US)
Widely useful stainless steel forging B(U) packaging, 8:54418 (RA;US)
Loading
Operational experience in loading spent fuel casks in European LWRs, 8:53505 (RA;US)
Maintenance
Three years of experience and future prospects in maintenance and reinspection on LWR-irradiated fuel transport flasks, 8:54454 (RA;US)
Materials Testing
Application of linear-elastic fracture mechanics concepts to ferritic spent fuel shipping casks, 8:54379 (RA;US)
Properties of nodular ductile graphite cast iron used in GNS-manufactured spent fuel casks, 8:54381 (RA;US)
Selection and certification of materials for casks intended for the transport and intermediate storage of spent fuel, 8:54434 (RA;US)
TN 1300 cask casting process and material qualification, 8:54382 (RA;US)
Operation
Operating experience with two transport storage casks for surface storage of spent HTGR fuel elements, 8:53529 (RA;US)
Operational experience with the HZ-75T spent fuel shipping cask, 8:54463 (RA;US)
Performance
Operating experience of cask-type dry storage and spent fuel performance, 8:53495 (RA;US)
Performance Testing
Argentine developments for a Type B cask, 8:54404 (RA;US)
Experimental and numerical study of the thermal tests on the spent fuel shipping cask (50-ton-class cask) using a furnace, 8:54438 (RA;US)
Thermal analysis for the design of a CANDU irradiated fuel transportation cask, 8:54436 (RA;US)
Residual Stresses
Thermal analysis of lead pour fabrication process for a spent fuel shipping cask, 8:54447 (RA;US)
Sabotage
Assessment of the safety of spent fuel transportation in urban environs, 8:53553 (RA;US)
Scaling
Feasibility study for scaling ferritic shipping casks for drop-tests, 8:54428 (RA;US)
Shielding
Experimental and analytical study on shielding of spent fuel shipping cask, 8:54459 (RA;US)
Safety analysis code systems for spent fuel cask in JINS, 8:54460 (RA;US)
Shock Absorbers
Analysis method for the design of transport packagings shock absorbing end covers, 8:54468 (RA;US)
Analysis of the behavior under impact loads of a shell-type shock absorber for LWR spent fuel transport packaging, 8:54467 (RA;US)
Development of a toroidal shell-type shock absorber for an irradiated fuel shipping cask, 8:54466 (RA;US)
Impact limiter design methodology, 8:54469 (RA;US)
Specifications
Family of casks for transport of LWR spent fuel, 8:54417 (RA;US)
Qualification and certification criteria of casks for the intermediate dry storage of spent fuel in the Federal Republic of Germany, 8:54385 (RA;US)
Storage Facilities
Storage facility for casks awaiting shipment, 8:53506 (RA;US)
Stress Analysis
Stress analysis for a spent fuel shipping cask, 8:54448 (RA;US)
Surface Contamination
Contamination studies on pond-loaded casks, 8:53711 (RA;US)
Fundamental studies of the ionic contamination of painted surfaces, 8:53712 (RA;US)
Temperature Effects
Experimental determination of radionuclide release and transport from spent fuel exposed to cask fire environments, 8:53705 (RA;US)
Experimental and numerical study of the thermal tests on the spent fuel shipping cask (50-ton-class cask) using a furnace, 8:54438 (RA;US)
Thermal analysis for the design of a CANDU irradiated fuel transportation cask, 8:54436 (RA;US)
Testing
TN 1300 shipping/storage cask system for spent fuel, 8:53588 (BA;XN)
Thermal Testing
Thermal trials on a water-cooled LWR flask, 8:54416 (RA;US)

SPENT FUEL ELEMENTS
Damage
Experience with fuel damage caused by abnormal conditions in handling and transport, 8:53868 (RA;US)
Heat Transfer
Heat transfer in a dry horizontal spent LWR fuel assembly (experimental validation of the computer code RIGG), 8:53543 (RA;US)
Materials Handling
Experience with fuel damage caused by abnormal conditions in handling and transport, 8:53868 (RA;US)
Nondestructive Analysis
Method and apparatus for measuring reactivity of fissile material, 8:53722 (P;US)

SPENT FUEL STORAGE
See also AWAY-FROM-REACTOR STORAGE
DRY STORAGE
Combined storage for LWR spent fuel and high-level waste (MOdular DRy EXpandable storage system), 8:53527 (RA;US)
Monitored retrievable storage: a waste management option for spent fuel and high-level wastes, 8:53679 (R;US)
Storage Facilities
Decommissioning of independent spent fuel storage installations, 8:53633 (RA;US)

SPENT FUELS
Cherenkov Radiation
Method for monitoring irradiated nuclear fuel using cerenkov radiation, 8:53475 (P;US)
Criticality
Criticality safety analysis of transport packages for fissile materials and transport index evaluation, 8:54458 (RA;US)
Delivery
Facility-transportation system interface at COGEMA: experience in the taking delivery of spent fuel, 8:53503 (RA;US)
Maritime Transport
Notes on the design of ships used in the international transport of irradiated nuclear fuel, 8:53558 (RA;US)

Proposal of guidelines for selecting optimum options in packaging and transportation systems of spent fuel, 8:53545 (RA;US)
Realization of a sea transport system for radioactive material, 8:53559 (RA;US)
Packaging
Construction and inservice inspection rules for nuclear spent fuel and high-level waste transport packagings, 8:53568 (RA;US)
Design rules for containment systems of nuclear spent fuel and high-level waste transport packagings, 8:53570 (RA;US)
Proposal of guidelines for selecting optimum options in packaging and transportation systems of spent fuel, 8:53545 (RA;US)
Radiation Monitoring
Method for monitoring irradiated nuclear fuel using cerenkov radiation, 8:53475 (P;US)
Rail Transport
Spent fuel shipping costs for transportation logistics analyses, 8:53557 (RA;US)
US Department of Energy sponsored techniques for computerzed transportation routing analysis, 8:53528 (RA;US)
Reprocessing
Assessment of overseas developments in methods for treatment and disposal of high-level radioactive wastes, 8:53601 (R;AU)
Breeder reactor fuel reprocessing, 8:53473 (R;US)
Road Transport
US Department of Energy sponsored techniques for computerzed transportation routing analysis, 8:53528 (RA;US)
Transport
20 years experience of large-scale movement of irradiated fuel by the CEGB, 8:53564 (RA;US)
Goal system for comparative assessments of nuclear fuel transport under security aspects, 8:53716 (RA;US)
MTR irradiated fuel transports, 8:53566 (RA;US)
Spent fuel: transportable, 8:53522 (RA;US)
Storage and transportation of spent fuel and high-level waste using dry storage casks, 8:53497 (RA;US)
Transport of fast breeder reactor spent fuel in gas-filled casks, 8:53560 (RA;US)
Transport of irradiated fuel to the La Hague reprocessing plant, 8:53565 (RA;US)
Transporting spent reactor fuel: allegations and responses, 8:53582 (R;US)

SPERMATOGONIA
Biological Radiation Effects
Comparison of stem-spermatogonial renewal and mitotic activity in the γ-irratiated mouse and rat, 8:55053 (J;NL)

SPHERES
Dendrites
Numerical solution to the Stokes equations for flow past two spheres and a chain of particles attached to a sphere, with an application to filter clogging, 8:55122 (R;US)
Flow Models
Numerical solution to the Stokes equations for flow past two spheres and a chain of particles attached to a sphere, with an application to filter clogging, 8:55122 (R;US)

SPONTANEOUS COMBUSTION
Activation Energy
Lectures on mathematical combustion. Lecture 1. Pre-asymptotic combustion revisited. Interim technical report, 8:54351 (R;US)
Mathematical Models
Lectures on mathematical combustion. Lecture 1. Pre-asymptotic combustion revisited. Interim technical report, 8:54351 (R;US)

SPRAY COATING
Energy Efficiency
Assessment of energy-efficiency improvements for paint spray booths, 8:54162 (R;US)

SQUARE-WAVE GENERATORS
See FUNCTION GENERATORS

SQUID DEVICES
Superconducting Quantum Interference Devices
Performance
Analysis of novel superconducting magnetometer with superior noise and coupling properties. Interim report, 8:54372 (R;US)
Uses
Applications of Josephson junction SQUIDS (superconducting quantum interference device) and arrays. Annual progress report No. 1, 1 September 81-30 September 82, 8:54370 (R;US)
Demonstration of SQUID (superconducting quantum interference device) parametric amplifier. Annual report No. 1, 14 September 81-14 September 82, 8:54371 (R;US)

SRC PROCESS
Coal Liquids
Physical properties of SRC-I slurries under preheater conditions. Final report, 8:53348 (R;US)
Organic Solvents
Physical properties of SRC-I slurries under preheater conditions. Final report, 8:53348 (R;US)

SRE REACTOR
Reactor Decommissioning
Lessons learned in decommissioning the Sodium Reactor Experiment, 8:53990 (RA;US)
Reactor Dismantling
Lessons learned in decommissioning the Sodium Reactor Experiment, 8:53990 (RA;US)

STAINLESS STEEL-21-6-9
Physical Radiation Effects
Helium damage in austenitic stainless steels, 8:54210 (R;US)

STAINLESS STEEL-304
Corrosion
Studies on analytical method and nondestructive measuring method on the sensitization of austenitic stainless steels, 8:54540 (R;JP)
Creep
Small angle neutron scattering study of the damage induced by creep deformation in AISI 304 stainless steel, 8:54238 (R;US)
Deformation
Small angle neutron scattering study of the damage induced by creep deformation in AISI 304 stainless steel, 8:54238 (R;US)
Nondestructive Testing
Studies on analytical method and nondestructive measuring method on the sensitization of austenitic stainless steels, 8:54540 (R;JP)

STAINLESS STEEL-304L
Activation Analysis
Ion beam measurements of depth profiles of deuterium concentration in steels. Pt.II: investigation of stainless steel types 304L and EN58E and conclusions of parts I and II, 8:54302 (R;GB)
Corrosion
Long-term performance of materials used for high-level waste packaging. Quarterly report, April-June 1983, 8:53656 (R;US)
Failures
Review of DOE waste package program. Subtask 1.1. National waste package program, October 1982-March 1983. Vol. 4, 8:53652 (R;US)
Physical Radiation Effects
Helium damage in austenitic stainless steels, 8:54210 (R;US)

STAINLESS STEEL-310
Chemical Composition
Corrosion response of downhole steam generator assembly and instrumentation and supply line tubings at Long Beach field test, 8:53434 (R;US)
Corrosion
Corrosion response of downhole steam generator assembly and instrumentation and supply line tubings at Long Beach field test, 8:53434 (R;US)
Ultimate Strength
Corrosion response of downhole steam generator assembly and instrumentation and supply line tubings at Long Beach field test, 8:53434 (R;US)

Yield Strength
Corrosion response of downhole steam generator assembly and instrumentation and supply line tubings at Long Beach field test, 8:53434 (R;US)

STAINLESS STEEL-316
Chemical Composition
Corrosion response of downhole steam generator assembly and instrumentation and supply line tubings at Long Beach field test, 8:53434 (R;US)
Corrosion
Corrosion response of downhole steam generator assembly and instrumentation and supply line tubings at Long Beach field test, 8:53434 (R;US)
Studies on analytical method and nondestructive measuring method on the sensitization of austenitic stainless steels, 8:54540 (R;JP)
Fabrication
Fabrication of UO_2-stainless steel fuel for a fast-reactor safety test, 8:54020 (R;US)
Nondestructive Testing
Studies on analytical method and nondestructive measuring method on the sensitization of austenitic stainless steels, 8:54540 (R;JP)
Physical Radiation Effects
Cavity growth in dual-ion and/or electron irradiated type 316 stainless steel, 8:54231 (RA;US)
Helium damage in austenitic stainless steels, 8:54210 (R;US)
Influence of nitrogen and carbon on void swelling in 316 stainless steel in-situ observed by a HVEM, 8:54232 (RA;US)
Ultimate Strength
Corrosion response of downhole steam generator assembly and instrumentation and supply line tubings at Long Beach field test, 8:53434 (R;US)
Yield Strength
Corrosion response of downhole steam generator assembly and instrumentation and supply line tubings at Long Beach field test, 8:53434 (R;US)

STAINLESS STEELS
See also STAINLESS STEEL-21-6-9
STAINLESS STEEL-304
STAINLESS STEEL-304L
STAINLESS STEEL-310
STAINLESS STEEL-316
Activation Analysis
Ion beam measurements of depth profiles of deuterium concentration in steels. Pt.II: investigation of stainless steel types 304L and EN58E and conclusions of parts I and II, 8:54302 (R;GB)
Corrosion
Durability of marker materials for nuclear waste isolation sites, 8:53670 (R;US)
Crystallization
Refractory-metal stabilized amorphous stainless steel. Part 1. Formation and stability of amorphous stainless steel with W or Ti, 8:54249 (J;GB)
Service Life
Durability of marker materials for nuclear waste isolation sites, 8:53670 (R;US)
Weathering
Durability of marker materials for nuclear waste isolation sites, 8:53670 (R;US)
Welded Joints
Austenitic stainless steel-ferritic steel weld joint failures, 8:54245 (J;US)

STANDARDS
See also CALIBRATION STANDARDS
US Organizations
ANSI N14 standards committee, 8:53567 (RA;US)

STANDING CROP
See BIOMASS

STANFORD 20-GEV LINAC
Beam Dumps
SLAC 200-kW Copper Sphere Beam Dump (100 kW actual): SA-901-061-01-R2 Subassembly; CK-082-783-00-R0 Auxiliary Drawing List (Engineering Materials), 8:54601 (E;US)
Engineering Drawings
SLAC 200-kW Copper Sphere Beam Dump (100 kW actual): SA-901-061-01-R2 Subassembly; CK-082-783-00-R0 Auxiliary Drawing List (Engineering Materials), 8:54601 (E;US)
Klystrons
SLAC 60kW sub-booster klystron and permanent magnet (Engineering Materials), 8:54599 (E;US)
RF Systems
SLAC 60kW sub-booster klystron and permanent magnet (Engineering Materials), 8:54599 (E;US)

STANFORD LINEAR ACCELERATOR CENTER
Operation
SLAC users bulletin No. 95, March-July 1983, 8:54605 (R;US)

STATE BUILDINGS
See PUBLIC BUILDINGS

STATE GOVERNMENT
Directories
Energy emergency handbook, 8:54055 (R;US)
Emergency Plans
Emergency response guidelines for state and local governments for radioactive material transportation accidents, 8:53706 (RA;US)
Energy emergency handbook, 8:54055 (R;US)

STATIONARY POLLUTANT SOURCES
Used for general articles when sources are not named. See also specific stationary sources, e.g., Fossil-fuel Power Plants.
Environmental Impacts
Impact of New York state emission sources on Class 1 areas, 8:54894 (J;NL)

STATISTICS
Limited to the indexing of information on the mathematical discipline of statistics or its application in other scientific disciplines; for indexing numerical values of a statistical nature use STATISTICAL DATA.
See also REGRESSION ANALYSIS
Fourier Analysis
Weighted nonparametric tail estimation procedures, 8:55227 (R;US)
Series Expansion
Weighted nonparametric tail estimation procedures, 8:55227 (R;US)

STEAM
Dropwise Condensation
Conditions for dropwise condensation on electroplated gold. Final report, February 15, 1980-August 14, 1983, 8:54209 (R;US)

STEAM COOLANT
See STEAM

STEAM GENERATORS
Design
Downhole steam generator using low pressure fuel and air supply, 8:53435 (P;US)
Fuel Substitution
Analysis of the financial impacts to the industrial energy user of using coal or municipal solid waste in a new process-steam-generating plant, 8:54185 (R;US)
Materials Testing
Corrosion response of downhole steam generator assembly and instrumentation and supply line tubings at Long Beach field test, 8:53434 (R;US)
Supports
Seismic Safety Margins Research Programs. Assessment of potential increases in risk due to degradation of steam generator and reactor coolant pump supports (PWR), 8:54032 (R;US)
Tubes
Improvement of ISI techniques by multi-frequency eddy current testing method for steam generator tube in PWR plant, 8:53875 (R;JP)

STEAM INJECTION
Steam Generators
Corrosion response of downhole steam generator assembly and instrumentation and supply line tubings at Long Beach field test, 8:53434 (R;US)
Downhole steam generator using low pressure fuel and air supply, 8:53435 (P;US)

Waste Water
Physical-chemical treatment of tar-sand processing wastewater, 8:53462 (R;US)
STEAM LINES
Leak Detectors
Acoustic system for pipe rupture monitoring and leak detection, 8:53938 (R;XA)
STEAM QUALITY
Computer Calculations
STP: A mathematically and physically consistent library of steam properties, 8:53926 (J;US)
STEAM SUPERHEATERS
See SUPERHEATERS
STEAM SYSTEMS
Steam Quality
STP: A mathematically and physically consistent library of steam properties, 8:53926 (J;US)
Water Saturation
STP: A mathematically and physically consistent library of steam properties, 8:53926 (J;US)
STEEL INDUSTRY
See METAL INDUSTRY
STEELS
See also AUSTENITIC STEELS
CARBON STEELS
FERRITIC STEELS
MANGANESE STEELS
MARAGING STEELS
STAINLESS STEELS
Decontamination
Vigorous decontamination tests of steel samples, 8:53999 (RA;US)
Fatigue
Fatigue crack growth and fracture resistance of steels in high-pressure hydrogen environments. Final report, 8:54211 (R;XE)
Hydrogen Embrittlement
Fatigue crack growth and fracture resistance of steels in high-pressure hydrogen environments. Final report, 8:54211 (R;XE)
STELLARATORS
See also WENDELSTEIN-7 STELLARATOR
Helical Configuration
Design of a helical-axis stellarator, 8:55320 (J;AT)
STEM CELLS
Biological Regeneration
Comparison of stem-spermatogonial renewal and mitotic activity in the γ-irratiated mouse and rat, 8:55053 (J;NL)
STIMULATED EMISSION DEVICES
See GASERS
LASERS
STOCHASTIC COOLING
Beam Monitors
Low-noise gallium-arsenide field-effect transistor preamplifiers for stochastic beam-cooling systems, 8:54619 (R;US)
Relativistic-beam Pickup Test Facility, 8:54574 (R;US)
Preamplifiers
Low-noise gallium-arsenide field-effect transistor preamplifiers for stochastic beam-cooling systems, 8:54619 (R;US)
STOCKHOLM R-1 REACTOR
See R-1 REACTOR
STOCKPILES
Drainage
Application of a coal-pile drainage model to an industrial/institutional site, 8:53418 (R;US)
Runoff
Application of a coal-pile drainage model to an industrial/institutional site, 8:53418 (R;US)
STOCKS
See INVENTORIES
STORAGE BATTERIES
See ELECTRIC BATTERIES
STORAGE BATTERIES (LEAD-ACID)
See LEAD-ACID BATTERIES
STORAGE FACILITIES
Decommissioning
Decommissioning alternatives for Savannah River Plant high-level waste tank 16, 8:53631 (RA;US)
Decommissioning of independent spent fuel storage installations, 8:53633 (RA;US)
Regional Analysis
Storage sites of solid mineral raw materials in Austria and their importance, 8:54063 (R;AT;In German)
STORAGE RINGS
See also ISABELLE STORAGE RINGS
PEP STORAGE RINGS
SPEAR
TRISTAN STORAGE RINGS
Beam Transport
Beam loss in accumulation ring due to charge transfer and ionization processes, 8:54638 (RA;JP)
Heavy Ions
Coherent instability of the heavy ion beam in the storage ring, 8:54637 (RA;JP)
Ion Beams
Beam loss in accumulation ring due to charge transfer and ionization processes, 8:54638 (RA;JP)
Particle Production
Calculation of muonic fields in the vicinity of high-energy proton accelerators, 8:54606 (R;SU;In Russian)
Polarized Beams
Improvement of radiative polarization in plane storage rings, 8:54591 (R;JP)
Shielding
Calculation of muonic fields in the vicinity of high-energy proton accelerators, 8:54606 (R;SU;In Russian)
Vacuum Systems
Operating status of TARN vacuum system and future tasks, 8:54642 (RA;JP;In Japanese)
Present status of the vacuum system of the electron storage ring, 8:54640 (RA;JP;In Japanese)
STORAGE (SPENT FUEL)
See SPENT FUEL STORAGE
STORES
See COMMERCIAL BUILDINGS
STOVES
Pipes
Corrosion evaluation of stove pipe materials and surface treatments. Final report, 8:54126 (R;US)
STRATEGIC PETROLEUM RESERVE
Legislation
Strategic Petroleum Reserve and Hawaii, 8:54091 (RA;US)
Site Selection
Strategic Petroleum Reserve and Hawaii, 8:54091 (RA;US)
STREAK PHOTOGRAPHY
Photocathodes
Deposition of cesium iodide on parylene, 8:54771 (R;US)
STREAMER SPARK CHAMBERS
Image Processing
Assembly and copying of the results of multiview events from the RISK chamber measured on AELT-2/160 device, 8:54703 (R;SU;In Russian)
Photographic Films
Reversal film development for streamer chamber track photographs, 8:54702 (R;SU)
Power Supplies
Two loop circuit of pulse charoge of forming lines for streamer chamber supply, 8:54699 (R;SU;In Russian)
STREAMS
Ground Subsidence
Stability of relocated stream channels. Final report, January 1978-December 1980, 8:54956 (R;US)
STREETS
See ROADS
STRESS CORROSION
Crack Propagation
Life prediction under stress corrosion conditions below K/sub ISCC/, 8:54215 (R;US)
STRING MODELS
Treating the interactions of extended particles through breaking and connection of strings.
Boltzmann-Vlasov Equation
Relativistic string theory and nonlinear two-dimensional sigma-model, 8:55150 (R;SU)

STRONTIUM 85
Retention
Whole-body and part-body turnover of ^{85}Sr in Paget's disease, 8:55055 (J;GB)
STRONTIUM 90
Food Chains
Levels of strontium 90 in the environment at PINSTECH (Period 1979-1980), 8:54927 (R;PK)
Preliminary investigation of radiation level and some radionuclides in imported food and food products, 8:54295 (R;TH)
Radioecological Concentration
Levels of strontium 90 in the environment at PINSTECH (Period 1979-1980), 8:54927 (R;PK)
Radionuclide concentrations in vegetation at a solid radioactive waste-disposal area in southeastern Idaho, 8:54932 (J;US)
Strontium-90 and cesium-137 in marine sediment; April, 1978 to March, 1979. Radioactivity survey related with environmental and dietary materials, 8:54934 (RA;JP)
Strontium-90 and cesium-137 in soil: April 1978 to March 1979. Radioactivity survey related with environmental and dietary materials, 8:54906 (RA;JP)
Strontium-90 and cesium-137 in service water; April, 1978 to September, 1978. Radioactivity survey related with environmental and dietary materials, 8:54935 (RA;JP)
Strontium-90 and cesium-137 in sea water; April, 1978 to March, 1979. Radioactivity survey related with environmental and dietary materials, 8:54936 (RA;JP)
Strontium-90 and cesium-137 in rain and dry fallout; April, 1978 to December, 1978. Radioactivity survey related with environmental and dietary materials, 8:54874 (RA;JP)
Strontium-90 and cesium-137 in air-borne dust; April, 1978 to September, 1978. Radioactivity survey related with environmental and dietary materials, 8:54875 (RA;JP)
Strontium-90 and cesium-137 in total diet; April, 1978 to March, 1979. Radioactivity survey related with environmental and dietary materials, 8:54907 (RA;JP)
Retention
Strontium-90 in the teeth of Bavarian children, 8:55044 (R;DE;In German)
Solvent Extraction
Preliminary investigation of radiation level and some radionuclides in imported food and food products, 8:54295 (R;TH)
STRONTIUM FLUORIDES
Physical Radiation Effects
Damage ingrowth and recovery in alpha-irradiated CaF_2, SrF_2, and BaF_2, 8:54282 (J;GB)
STRUCTURAL BUCKLING
See DEFORMATION
STRUCTURAL CHEMICAL ANALYSIS
Argonne intense pulsed neutron source used to solve the molecular structure of a novel organometallic complex, 8:54318 (J;US)
STRUCTURAL MATERIALS
See BUILDING MATERIALS
STRUCTURE (CRYSTAL)
See CRYSTAL STRUCTURE
STRUCTURES (BUILDINGS)
See BUILDINGS
STYRENE POLYMERS
See POLYSTYRENE
SUBBITUMINOUS COAL
Pyrolysis
Effects of additives upon the thermal degradation of subbituminous coals, 8:53353 (J;NL)
SUBCOOLED BOILING
Forced Convection
Convective heat transfer with a periodic longitudinal heat flux variation, 8:54521 (RA;US)
SUBSIDENCE (GROUND)
See GROUND SUBSIDENCE
SUBURBS
See URBAN AREAS
SUGAR CANE
Energy Source Development
Biomass-energy development in the sugar industry, 8:53765 (RA;US)
SULFATES
Ecological Concentration
National Performance Audit Program. Ambient air audits of analytical proficiency, 1981, 8:54904 (R;US)
SULFIDES
See also TUNGSTEN SULFIDES
Crystal-Phase Transformations
Electronically induced phase transformations. Annual report 1 Oct 81-30 Sep 82, 8:54270 (R;US)
SULFUR
Activation Analysis
Elemental composition of human and animal milk. A review. A report prepared under the auspices of the IAEA in collaboration with the WHO, 8:54983 (R;XA)
Atmospheric Chemistry
Estimates for the long-range transport of air pollution, 8:54892 (J;NL)
Chemical State
Particle size effects in oxidation of pyrite in air/water chemical coal cleaning, 8:53415 (RA;US)
Deposition
Estimation of wet and dry deposition of pollutant sulfur in eastern Canada as a function of major source regions, 8:54893 (J;NL)
Gas Chromatography
Analysis of lignite liquefaction products processed with syngas and hydrogen sulfide, 8:53381 (J;US)
SULFUR 35
Isotopic Exchange
Computerized system for matching and stretching two-dimensional gel patterns represented by parameter lists, 8:54338 (BA;DE)
SULFUR DIOXIDE
Adsorption
Reactivity of fly ashes in a spray dryer FGD process, 8:53386 (R;US)
Air Pollution Control
SO_2 abatement for coal-fired boilers in Japan. Final report Jun 81-Jan 83, 8:54905 (R;US)
Atmospheric Chemistry
Mechanism and rates of the gas phase oxidations of sulfur dioxide and the nitrogen oxides in the atmosphere, 8:54887 (R;US)
Ecological Concentration
National Performance Audit Program. Ambient air audits of analytical proficiency, 1981, 8:54904 (R;US)
Removal
Full-scale utility FGD (flue gas desulfurization) system adipic acid demonstration program. Volume 1. Process results. Final report Jun 80-Nov 82, 8:53391 (R;US)
Full-scale utility FGD (flue gas desulfurization) system adipic acid demonstration program. Volume 2. Continuous emissions monitoring results. Final report Jun 80-Nov 82, 8:53392 (R;US)
Voltametry
Photoassisted reduction of sulfur dioxide in nonaqueous solutions at p-type semiconductor electrodes, 8:54313 (J;US)
SULFUR FLUORIDES
Electron Attachment
Electron-molecule interactions in gases and liquids: the electron-attachment process in gases and nonpolar liquids, 8:55110 (R;US)
Energy Transfer
Kinetics of elementary atom and radical reactions. Progress report, 8:55111 (R;US)
SULFUR IONS
Ion-Atom Collisions
Interference effects in the quasimolecularen K-radiation induced in collisions of hydrogen-like ions, 8:55105 (R;DE;In German)
SULFUR OXIDES
See also SULFUR DIOXIDE

Burners
Sulfur oxides control burner. Final report Oct 79-Sep 81, 8:53420 (R;US)
SULFUR SULFIDES
See SULFUR
SUN
Magnetic Fields
Quantitative study of magnetic flux transport on the sun, 8:55088 (R;US)
SUNSPOTS
Oscillations
Dynamical phenomena in sunspots. Final report 1 Mar-31 Jul 82, 8:55086 (R;US)
X Radiation
Studies of solar Ca K plages and UV, X-ray and 10 cm variations. Technical memo, 8:55096 (R;US)
SUPER PHENIX REACTOR
Core Catchers
Internal core catcher in Super Phenix, 8:53987 (R;FR)
Spent Fuel Storage
Super Phenix spent fuel storage cask, Castor SPX, 8:53494 (RA;US)
SUPERCONDUCTING COILS
AC Losses
a-c losses of 19-strand subcables for the ANL 3.3-MJ coil, 8:54471 (R;US)
SUPERCONDUCTING COMPOSITES
Microstructure
HVEM study of Nb_3Sn multifilamentary superconducting wires, 8:54476 (RA;US)
SUPERCONDUCTING MAGNETS
Cooling
Forced two-phase cooling of the TPC superconducting solenoid, 8:54477 (R;US)
Design
Advanced high-field coil designs: 20 TESLA, 8:55310 (R;US)
Electrical Faults
Consequences of shorted turns in a superconducting magnet, 8:54472 (R;US)
Energy Transfer
Modeling and simulation of energy-removal system for superconducting magnets, 8:55261 (R;US)
Magnet Pole Pieces
To the choice of a konfiguration of electromagnet magnetic circuit elements, 8:54622 (R;SU;In Russian)
Magnetic Fields
Magnetic field measurements of superconducting magnets for the colliding beam accelerator, 8:54632 (R;US)
Warm measurements of CBA superconducting magnets, 8:54576 (R;US)
Performance Testing
Three prototype units of a superconducting magnet system, 8:54613 (R;SU;In Russian)
Safety
Modeling and simulation of energy-removal system for superconducting magnets, 8:55261 (R;US)
Test Facilities
Automation of a cryogenic facility by commercial process-control computer, 8:54374 (R;US)
SUPERCONDUCTING QUANTUM INTERFERENCE DEVI
See SQUID DEVICES
SUPERCONDUCTING WIRES
Microstructure
HVEM study of Nb_3Sn multifilamentary superconducting wires, 8:54476 (RA;US)
SUPERCONDUCTORS
Computerized Simulation
Transient heat transfer in coated superconductors. Final scientific report 1 Jun 81-1 Sep 82, 8:55220 (R;US)
Crystal Field
Magnetism and crystal fields in ternary superconductors (RE Rh_4B_4), 8:54288 (BA;US)
Heat Transfer
Transient heat transfer in coated superconductors. Final scientific report 1 Jun 81-1 Sep 82, 8:55220 (R;US)
Physical Radiation Effects
Spallation and 14-MeV neutron irradiation of stabilized NbTi superconductors, 8:55282 (R;US)
Transition Temperature
Analysis of thermal conductivity data for fourteen elements in normal and superconducting states. State-of-the-art report, 8:54206 (R;US)
SUPERHEATERS
Welded Joints
Austenitic stainless steel-ferritic steel weld joint failures, 8:54245 (J;US)
SUPERVOLTAGE RADIOTHERAPY
See RADIOTHERAPY
SUPPORTS
Failures
Seismic Safety Margins Research Programs. Assessment of potential increases in risk due to degradation of steam generator and reactor coolant pump supports (PWR), 8:54032 (R;US)
Seismic Effects
Seismic Safety Margins Research Programs. Assessment of potential increases in risk due to degradation of steam generator and reactor coolant pump supports (PWR), 8:54032 (R;US)
SUPPORTS (CATALYST)
See CATALYST SUPPORTS
SURFACE BARRIER DETECTORS
Energy Resolution
Use of solid state detectors for spectrometry of conversion electrons emitted in the decay of lead-210, 8:54667 (RA;AU)
SURFACE BOILING
See SUBCOOLED BOILING
SURFACE MINING
Aerial Surveying
Surface mining environmental monitoring and reclamation handbook (Book), 8:53400 (R;US)
Baseline Ecology
Surface mining environmental monitoring and reclamation handbook (Book), 8:53400 (R;US)
Environmental Effects
Surface mining environmental monitoring and reclamation handbook (Book), 8:53400 (R;US)
Explosive Fracturing
Surface mining environmental monitoring and reclamation handbook (Book), 8:53400 (R;US)
Ground Subsidence
Surface mining environmental monitoring and reclamation handbook (Book), 8:53400 (R;US)
Hydrology
Surface mining environmental monitoring and reclamation handbook (Book), 8:53400 (R;US)
Land Reclamation
Reduction of land recontouring costs. Volume I. Texas lignite field. Open file report Sep 78-Jan 81, 8:53395 (R;US)
Reduction of land recontouring costs. Volume II. bituminous coal field, northeast Arizona. Open file report Feb 79-Jun 82, 8:53396 (R;US)
Surface mining environmental monitoring and reclamation handbook (Book), 8:53400 (R;US)
Manuals
Surface mining environmental monitoring and reclamation handbook (Book), 8:53400 (R;US)
Permit Applications
Surface mining environmental monitoring and reclamation handbook (Book), 8:53400 (R;US)
Slope Stability
Use of aircraft imagery in evaluating ground stability at open-pit uranium mines in Gas Hills, Wyoming, 8:53468 (R;US)
SURFACE MINING ACTS
Surface mining environmental monitoring and reclamation handbook (Book), 8:53400 (R;US)
SURFACE PROPERTIES
Research Programs
Structure and reactivity of heterogeneous surfaces and study of the geometry of surface complexes. Progress report, January 1, 1983-December 31, 1983, 8:54307 (R;US)
SURFACE WATERS
See also COASTAL WATERS
ESTUARIES
LAKES

STREAMS
WATER RESERVOIRS
Radionuclide Migration
Levels of strontium 90 in the environment at PINSTECH (Period 1979-1980), 8:54927 (R;PK)
SURFACES
Chemical Properties
Structure and reactivity of heterogeneous surfaces and study of the geometry of surface complexes. Progress report, January 1, 1983-December 31, 1983, 8:54307 (R;US)
Crystallography
Structure and reactivity of heterogeneous surfaces and study of the geometry of surface complexes. Progress report, January 1, 1983-December 31, 1983, 8:54307 (R;US)
SUSPENSIONS
See also SLURRIES
Deposition
Method for depositing a uniform layer of particulate material on the surface of an article having interconnected porosity, 8:54369 (P;US)
SUSPENSIONS (FUEL)
See FUEL SLURRIES
SWEAT GLANDS
See SKIN
SWEDEN
Aerosol Monitoring
Total airborne mercury and its possible origin, 8:54890 (J;NL)
SWEDISH REACTOR R-1
See R-1 REACTOR
SWITCHES
See also PLASMA SWITCHES
Magnetic switch for reactor control rod (LMFBR), 8:53950 (P;US)
Design
Thermally actuated thermionic switch, 8:54556 (P;US)
Thermionics
Thermally actuated thermionic switch, 8:54556 (P;US)
SWITCHING CIRCUITS
Design
FET full-bridge switcher for inductorless capacitor charging for Nova, 8:54554 (R;US)
Electric Bridges
FET full-bridge switcher for inductorless capacitor charging for Nova, 8:54554 (R;US)
Field Effect Transistors
FET full-bridge switcher for inductorless capacitor charging for Nova, 8:54554 (R;US)
SWITZERLAND
Energy Consumption
'Modal Splits' for safeguarding Switzerland's energy supply until the year 2000, 8:54056 (R;CH;In German)
Energy Models
'Modal Splits' for safeguarding Switzerland's energy supply until the year 2000, 8:54056 (R;CH;In German)
Energy Supplies
'Modal Splits' for safeguarding Switzerland's energy supply until the year 2000, 8:54056 (R;CH;In German)
SYNCHROPHASOTRONS
See SYNCHROTRONS
SYNCHROTRON RADIATION SOURCES
See also NSLS
Mirrors
Computer simulation of the heating effect on mirrors by synchrotron radiation, 8:54644 (R;JP)
Manufacture of mirrors by NC machining of EEM, 8:54473 (RA;JP;In Japanese)
Vacuum Systems
Simulation of acoustic delay line (ADL) system for light pipe in the radiated light facility by computer and analog circuits, 8:54549 (RA;JP;In Japanese)
Windows
Beryllium window for synchrotron radiation, 8:54617 (R;JP;In Japanese)
SYNCHROTRONS
See also BROOKHAVEN AGS
CERN SPS SYNCHROTRON
FERMILAB ACCELERATOR
JINR SYNCHROTRON
KEK SYNCHROTRON
LAMPF II SYNCHROTRON
NSLS
TEVATRON
TOKYO SYNCHROTRON
Beam Dynamics
Resonance behavior in the presence of space charge, 8:54575 (R;US)
Orbits
Orbit correction in a heavy-ion synchrotron, 8:54586 (R;SU;In Russian)
Orbit correction in synchrotrons. Review, 8:54587 (R;SU;In Russian)
SYNTHETIC FUELS
See also HYDROGEN FUELS
Commercialization
Utility Applications and Synthetic Fuels and Chemicals Market Sector: workbook, 8:53778 (R;US)
Toxicity
Problems of toxicological testing of complex mixtures, 8:53424 (R;US)
SYNTHINE PROCESS
See FISCHER-TROPSCH SYNTHESIS

T

TAILINGS
Solid residue separated in the preparation of various products.
See also MILL TAILINGS
Radon
Study of radon emanation from waste rock at Northern Territory uranium mines, 8:53604 (RA;AU)
TANDEM ELECTROSTATIC ACCELERATORS
Prior to February 1979,information was indexed to Van de Graaff Accelerators.
Reviews
10 years Rossendorf Tandem, 8:54624 (R;DD;In German)
Uses
High-sensitivity mass spectrometry with a tandem accelerator, 8:54603 (R;US)
Vacuum Systems
Vacuum system of tandem type electrostatic accelerator of Kyushu University, 8:54615 (RA;JP;In Japanese)
TANDEM MIRROR DEVICES
See TMR REACTORS
TMX DEVICES
TANDEM MIRROR TYPE REACTORS
See TMR REACTORS
TANK FARMS
See STORAGE FACILITIES
TANTALUM
Microstructure
HVEM studies of precipitate morphology symmetries, 8:54225 (RA;US)
Thermal Conductivity
Analysis of thermal conductivity data for fourteen elements in normal and superconducting states. State-of-the-art report, 8:54206 (R;US)
Transition Temperature
Analysis of thermal conductivity data for fourteen elements in normal and superconducting states. State-of-the-art report, 8:54206 (R;US)
TANTALUM 181 TARGET
Proton Reactions
Deuteron production in proton-nucleus interactions at 7.5 GeV/c, 8:55183 (R;SU;In Russian)
TANTALUM OXIDES
Catalytic Effects
Hydrous metal oxide ion exchangers as hydrogenation catalysts for direct coal liquefaction, 8:53360 (J;US)
TAR SAND OIL
See BITUMENS
TAR SANDS
See OIL SANDS

TARGETS
See also ALUMINIUM 27 TARGET
AMERICIUM 241 TARGET
AMERICIUM 243 TARGET
BERYLLIUM 9 TARGET
BROMINE 81 TARGET
CADMIUM 111 TARGET
CALCIUM 40 TARGET
CARBON 12 TARGET
COPPER 65 TARGET
CURIUM 242 TARGET
CURIUM 243 TARGET
CURIUM 244 TARGET
CURIUM 245 TARGET
CURIUM 246 TARGET
CURIUM 247 TARGET
CURIUM 248 TARGET
IODINE 127 TARGET
ION BEAM TARGETS
IRON 56 TARGET
LANTHANUM 139 TARGET
LASER TARGETS
LEAD 208 TARGET
LITHIUM 7 TARGET
MOLYBDENUM 98 TARGET
NICKEL 60 TARGET
NICKEL 62 TARGET
NIOBIUM 93 TARGET
OXYGEN 16 TARGET
SELENIUM 77 TARGET
SILICON 28 TARGET
SODIUM 22 TARGET
TANTALUM 181 TARGET
TIN 116 TARGET
TIN 117 TARGET
TIN 118 TARGET
TIN 120 TARGET
TIN 122 TARGET
TIN 124 TARGET
URANIUM 238 TARGET
ZIRCONIUM 90 TARGET
Coatings
Coated foams, preparation, uses and articles (Patent), 8:53725 (P;US)
Implosions
Thermonuclear burn in cylindrical targets. Final report, 8:55255 (R;US)
TATB
Detonations
Comparison of TATB and DINGU explosive properties, 8:54825 (RA;US)
Detonation properties of condensed explosives calculated with an equation of state based on intermolecular potentials, 8:54838 (RA;US)
Influence of the reaction zone on the state of detonation in a steady axial wave, 8:54834 (RA;US)
Numerical simulations of non-ideal detonations of a heterogeneous explosive with the two dimensional eulerian code C.E.E., 8:54837 (RA;US)
Shock initiation in gap test configurations, 8:54808 (RA;US)
Shock initiation of TATB formulations, 8:54819 (RA;US)
Impact Shock
Shock initiation of TATB formulations, 8:54819 (RA;US)
Impact Tests
Laboratory scale sensitivity testing of insensitive high explosives (Drop hammer and thermal testing of HMX and TATB), 8:54858 (RA;US)
Sensitivity
Laboratory scale sensitivity testing of insensitive high explosives (Drop hammer and thermal testing of HMX and TATB), 8:54858 (RA;US)
Shock initiation in gap test configurations, 8:54808 (RA;US)
Thermal Testing
Laboratory scale sensitivity testing of insensitive high explosives (Drop hammer and thermal testing of HMX and TATB), 8:54858 (RA;US)
TAU LEPTONS
See TAU PARTICLES
TAU PARTICLES
Weak Particle Decay
Tau and B lifetime measurements from the MARK II, 8:55142 (R;US)
TAUONS
See TAU PARTICLES
TECHNETIUM
Biogeochemistry
Ecological Research Division Marine Research Program, 8:54951 (R;US)
TECHNETIUM 99
Production
Effect of milking efficiency on Tc-99 content of Tc-99m derived from Tc-99m generators, 8:54344 (RA;AU)
Radioecological Concentration
Comparative behavior of ^{99}Tc, ^{129}I, ^{127}I and ^{137}Cs in the environment adjacent to a fuels reprocessing facility, 8:54928 (J;GB)
Spatial Distribution
Comparative behavior of ^{99}Tc, ^{129}I, ^{127}I and ^{137}Cs in the environment adjacent to a fuels reprocessing facility, 8:54928 (J;GB)
TEETH
Radionuclide Kinetics
Strontium-90 in the teeth of Bavarian children, 8:55044 (R;DE;In German)
TEFLON
Compacting
Compaction of porous beds of inert materials, 8:54851 (RA;US)
TELESCOPE COUNTERS
Plastic Scintillation Detectors
Searching for the GUT monopole, 8:54655 (RA;US)
TEM (MICROSCOPY)
See TRANSMISSION ELECTRON MICROSCOPY
TEMPERATURE MEASUREMENT
Errors
TWIST: a computer program to calculate errors due to degradation of insulation resistance of mineral insulated thermocouple cables, 8:53930 (R;XA)
TENNESSEE VALLEY AUTHORITY
Fossil-Fuel Power Plants
Examining relationships between coal characteristics and the performance of TVA power plants. Final report, 8:53861 (R;US)
TERATOGEN SCREENING
Insects
Use of the cricket embryo (Acheta domesticus) as an invertebrate teratology model, 8:55069 (R;US)
TERMINAL FACILITIES
Capacity
Florida statewide coal-conversion study: coal-supply and transportation analysis, 8:53859 (R;US)
TERRESTRIAL BACKGROUND
See BACKGROUND RADIATION
TERRESTRIAL ECOSYSTEMS
Acidification
The potential acidity associated with dews, frosts, and fogs, 8:54915 (J;NL)
Radionuclide Migration
Plutonium contents and fluxes in a soybean crop ecosystem near a nuclear fuel chemical separations facility, 8:54931 (J;US)
TEST FACILITIES
Facility for repeatable fire testing, 8:54439 (RA;US)
Computerized Control Systems
Automation of a cryogenic facility by commercial process-control computer, 8:54374 (R;US)
Diesel Engines
Shakedown and preliminary calibration tests for the fuel engine evaluation system using the Km914A Sachs Rotary Combustion Engine. Technical note, 8:54196 (R;US)
Performance Testing
Shakedown and preliminary calibration tests for the fuel engine evaluation system using the Km914A Sachs Rotary Combustion Engine. Technical note, 8:54196 (R;US)
Specifications
National rf test facility, 8:55270 (RA;US)
TESTES
Dose Equivalents
Evaluation of the radiation doses to uranium mine employees exposed to external gamma radiation, 8:54999 (R;AU)

TESTING (MATERIALS)
See MATERIALS TESTING
TETRAHYDROFURAN
Solvent Properties
Effect of solvent pretreatment on coal liquefaction, 8:53361 (J;US)
TEVATRON
Beam Extraction
FNAL plans for upgrading the fixed target experimental area to 1 TeV, 8:54602 (RA;XC)
Beam Transport
FNAL plans for upgrading the fixed target experimental area to 1 TeV, 8:54602 (RA;XC)
Experiment Planning
High-energy photoproduction of states containing heavy quarks and other rare phenomena, 8:55137 (R;US)
Multiparticle Spectrometers
High-energy photoproduction of states containing heavy quarks and other rare phenomena, 8:55137 (R;US)
TEXAS
Energy Conservation
Energy and other resource conservation within urbanizing areas, 8:54176 (J;US)
Oil Sand Deposits
Conoco's tar sands development in south Texas, 8:53459 (RA;US)
Tars and heavy crude in Texas, 8:53451 (RA;US)
Petroleum Deposits
Tars and heavy crude in Texas, 8:53451 (RA;US)
Resource Conservation
Energy and other resource conservation within urbanizing areas, 8:54176 (J;US)
Salt Deposits
Environmental characterization of bedded salt formations and overlying areas of the Permian Basin, 8:53689 (R;US)
Permian potentiometric analysis, 8:53676 (R;US)
TEXAS EXPERIMENTAL TOKAMAK
See TEXT DEVICES
TEXT DEVICES
Soft X Radiation
Observations of soft x-ray fluctuations with an imaging array on TEXT, 8:55244 (R;US)
TEXTILE INDUSTRY
Energy Conservation
Innovative industrial-materials processes, 8:54175 (R;US)
TFTR REACTORS
Microwave Amplifiers
ECRH transmission systems for PDX, PLT, TFTR and upgrades, 8:55275 (RA;US)
THERMAL BARRIERS
Reviews
Thermal barriers: their purpose and functioning, 8:55316 (R;US)
THERMAL DECOMPOSITION
See PYROLYSIS
THERMAL ENERGY STORAGE EQUIPMENT
Design
Method and apparatus for operating an improved thermocline storage unit, 8:54044 (P;US)
Some aspects of the computer simulation of conduction heat transfer and phase change processes, 8:54045 (BA;US)
Temperature Gradients
Method and apparatus for operating an improved thermocline storage unit, 8:54044 (P;US)
Thermal Insulation
Method and apparatus for operating an improved thermocline storage unit, 8:54044 (P;US)
THERMAL ENVELOPE HOUSES
See DOUBLE ENVELOPE BUILDINGS
THERMAL POLLUTION (AIR)
See AIR POLLUTION
THERMAL POLLUTION (WATER)
See WATER POLLUTION
THERMAL REACTORS
See also AEROJET-GENERAL NUCLEONICS REACTORS
AFRRI REACTOR
ALRR REACTOR
AVR REACTOR
BER-2 REACTOR
BEZNAU-1 REACTOR
CANDU TYPE REACTORS
GUNDREMMINGEN-2 REACTOR
HBWR REACTOR
HDR REACTOR
HINKLEY POINT-B REACTOR
JPDR REACTOR
KUHFR REACTOR
LACBWR REACTOR
LINGEN REACTOR
LUCENS REACTOR
LWBR TYPE REACTORS
NBSR REACTOR
NIEDERAICHBACH REACTOR
R-1 REACTOR
SHIPPINGPORT REACTOR
SHOREHAM REACTOR
SRE REACTOR
THREE MILE ISLAND-2 REACTOR
TRIGA-2-MUSASHI REACTOR
TURKEY POINT-3 REACTOR
TURKEY POINT-4 REACTOR
WAGR REACTOR
WWER TYPE REACTORS
Radiation Heating
Determination of radiation heating in a critical assembly, 8:53916 (R;SU;In Russian)
THERMAL WATERS
Chemical Analysis
Geothermal hydrology of Warner Valley, Oregon: a reconnaissance study, 8:53829 (R;US)
THERMOCOUPLES
Electric Cables
TWIST: a computer program to calculate errors due to degradation of insulation resistance of mineral insulated thermocouple cables, 8:53930 (R;XA)
Performance
Fuel temperature measurement in the WAGR, 8:53880 (R;XA)
Use of chromel-alumel thermocouples in high temperature experiments in WAGR, 8:53879 (R;XA)
THERMOLUMINESCENT DOSEMETERS
Design
Homogeneous TL dosemeter for direct reading of the biological radiation exposure in mixed neutron-gamma fields, 8:54735 (R;DD;In German)
Quantum Efficiency
Calculation of the neutron sensitivity of thermoluminescent detectors. 2. Relative light conversion ratio for various thermoluminescent detectors as a function of the LET, 8:54739 (R;DD;In German)
Radiation Effects
Effect of ultraviolet and visible radiation on the readout obtained from γ-irradiated and unirradiated $CaSO_4$:Dy in teflon discs, 8:54758 (RA;AU)
Sensitivity
Calculation of the neutron sensitivity of thermoluminescent detectors. 1. Fundamentals, 8:54738 (R;DD;In German)
Sterilization
Sterilization of TLD finger monitors, 8:55056 (J;GB)
THERMOLUMINESCENT DOSIMETRY
Glow Curve
Glow-curve analysis for verification of dose in LiF chips, 8:54749 (J;GB)
THERMOMETERS
See also GEOTHERMOMETERS
NOISE THERMOMETERS
Calibration
Specific heat of ^{3}He in the Fermi-liquid region, 8:54764 (R;US)
THERMONUCLEAR FUELS
Coatings
Coated foams, preparation, uses and articles (Patent), 8:53725 (P;US)
THERMONUCLEAR REACTIONS
Research Programs
Summary of SHERWOOD activities, 8:55233 (R;US)
THERMONUCLEAR REACTOR MATERIALS
Materials Testing
Irradiations at the Rotating Target Neutron Source-II. 1982 annual report: Joint US-Japan Sponsorship, 8:55307 (R;US)

THERMONUCLEAR REACTORS
For use in cases where certain aspects of either hypothetical or real thermonuclear reactors are discussed.
See also LASER FUSION REACTORS
MAGNETIC MIRROR TYPE REACTORS
TOKAMAK TYPE REACTORS
Magnetic Mirrors
Parameter optimizations of multiple-mirror reactors, 8:55318 (J;AT)
Radioactive Wastes
Disposal of activated fusion wall materials, 8:53727 (R;US)
THERMOPLASTICS
Physical Radiation Effects
Radiation stability of plastics and rubbers, 8:54267 (R;GB)
THF
See TETRAHYDROFURAN
THIN FILMS
Vapor Plating
Interface formation in physically deposited films, 8:54236 (R;US)
THIO COMPOUNDS
See ORGANIC SULFUR COMPOUNDS
THIOETHERS
See SULFIDES
THIOPHENE
Absorption Spectra
Differential optical absorption techniques for diagnostics of coal gasification. Technical progress report, April-June 1983, 8:53368 (R;US)
THORIUM
Radiochemical Analysis
Rapid method for the determination of americium-curium, plutonium and thorium in biological and environmental samples, 8:54349 (J;GB)
THORIUM 228
Radioecological Concentration
Radiological impact of the operation of coal-fired power stations within Australia, 8:53365 (RA;AU)
THORIUM 230
Isotope Ratio
Th-230/Th-232 sedimentation rates and the natural radiation background along the western coast of Israel. Final report for the period 15 December 1977 - 31 October 1981, 8:54953 (R;XA)
THORIUM 232
Isotope Ratio
Th-230/Th-232 sedimentation rates and the natural radiation background along the western coast of Israel. Final report for the period 15 December 1977 - 31 October 1981, 8:54953 (R;XA)
Radioactivity
Th-230/Th-232 sedimentation rates and the natural radiation background along the western coast of Israel. Final report for the period 15 December 1977 - 31 October 1981, 8:54953 (R;XA)
THORIUM ISOTOPES
See also THORIUM 228
THORIUM 230
THORIUM 232
Decay
Fifth research coordination meeting on the measurement and evaluation of transactinium isotope nuclear data. Central Bureau for Nuclear Measurements, Geel, Belgium, 1-3 September 1982. Summary report, 8:55195 (R;XA)
Environmental Exposure Pathway
Background radioactivity in the monazite areas of Kerala, India, 8:54924 (R;DE)
THORIUM X
See RADIUM 224
THORON
See RADON 220
THREE MILE ISLAND-2 REACTOR
Reactor Accidents
Accident at Three Mile Island and its aftermath, 8:54021 (R;US)
THYROID
Biological Radiation Effects
Iodine-129 uptake and effects of lifetime feeding in rats, 8:55057 (J;GB)
Radiosensitivity
Thyroid cancer from occupational exposures to iodine-131, 8:55011 (RA;US)
TID
See TRAVELLING IONOSPHERIC DISTURBANCE
TIGHT SANDS
See SANDSTONES
TIME PROJECTION CHAMBERS
See PROJECTION SPARK CHAMBERS
TIME-OF-FLIGHT SPECTROMETERS
TOF for heavy stable particle identification, 8:54722 (RA;US)
TIME-TO-AMPLITUDE CONVERTERS
Calibration
SLAC RHONDA-TAC test router module: LD 135-396-00-R0 Logic Diagram (Engineering Materials), 8:54598 (E;US)
Logic Circuits
SLAC RHONDA-TAC test router module: LD 135-396-00-R0 Logic Diagram (Engineering Materials), 8:54598 (E;US)
Test Facilities
SLAC TAC shift register tester: LD 135-397-00-R0 Logic Diagram (2 sheets) (Engineering Materials), 8:54668 (E;US)
TIN
Activation Analysis
Elemental composition of human and animal milk. A review. A report prepared under the auspices of the IAEA in collaboration with the WHO, 8:54983 (R;XA)
Proton Reactions
Deuteron production in proton-nucleus interactions at 7.5 GeV/c, 8:55183 (R;SU;In Russian)
TIN 116 TARGET
Neutron Reactions
Differential neutron scattering cross sections and average neutron parameters of tin isotopes, 8:55187 (R;SU;In Russian)
TIN 117 TARGET
Neutron Reactions
Parity nonconservation in neutron resonances (0.88 eV ^{81}Br, 4.53 eV ^{111}Cd, 1.33 eV ^{117}Sn, 0.75 eV ^{139}La neutron resonances), 8:55180 (R;SU;In Russian)
TIN 118 TARGET
Neutron Reactions
Differential neutron scattering cross sections and average neutron parameters of tin isotopes, 8:55187 (R;SU;In Ruscian)
TIN 120 TARGET
Neutron Reactions
Differential neutron scattering cross sections and average neutron parameters of tin isotopes, 8:55187 (R;SU;In Russian)
Pion Reactions
Study of isovector resonances with pion charge exchange, 8:55177 (J;NL)
TIN 122 TARGET
Neutron Reactions
Differential neutron scattering cross sections and average neutron parameters of tin isotopes, 8:55187 (R;SU;In Russian)
TIN 124 TARGET
Neutron Reactions
Differential neutron scattering cross sections and average neutron parameters of tin isotopes, 8:55187 (R;SU;In Russian)
TITANIUM
Corrosion
Long-term performance of materials used for high-level waste packaging. Quarterly report, April-June 1983, 8:53656 (R;US)
Inclusions
Ultrasonic 3-D reconstruction of inclusions in solids using the inverse Born algorithm, 8:54533 (R;US)

Materials Recovery
Mineral recovery from coal-conversion solid wastes, 8:53387 (R;US)
Physical Radiation Effects
Electron damage in Zr and Ti, 8:54228 (RA;US)
TITANIUM ALLOYS
See also ALLOY-A-286
TITANIUM BASE ALLOYS
Corrosion
Durability of marker materials for nuclear waste isolation sites, 8:53670 (R;US)
Crystallization
Refractory-metal stabilized amorphous stainless steel. Part 1. Formation and stability of amorphous stainless steel with W or Ti, 8:54249 (J;GB)
Oxidation
In-situ oxidation studies of vanadium-20% titanium alloy, 8:54223 (RA;US)
Physical Radiation Effects
Crystalline-amorphous transition in NiTi alloys induced by high-energy electron irradiation, 8:54234 (RA;US)
Effects of HVEM irradiation on ordered phases in Ni-Ti, 8:54220 (RA;US)
Spallation and 14-MeV neutron irradiation of stabilized NbTi superconductors, 8:55282 (R;US)
Service Life
Durability of marker materials for nuclear waste isolation sites, 8:53670 (R;US)
Weathering
Durability of marker materials for nuclear waste isolation sites, 8:53670 (R;US)
TITANIUM BASE ALLOYS
Failures
Review of DOE waste package program. Subtask 1.1. National waste package program, October 1982-March 1983. Vol. 4, 8:53652 (R;US)
TITANIUM BORIDES
Crystal Growth
Growth and properties of $Ni_{20.3}Ti_{2.7}B_6$ (tau-phase) crystals, 8:54265 (J;NL)
TITANIUM IONS
Emission Spectra
Dielectronic satellite spectra of hydrogen-like titanium (Ti XXII), 8:55246 (R;US)
TITANIUM OXIDES
See also RUTILE
Catalytic Effects
Hydrous metal oxide ion exchangers as hydrogenation catalysts for direct coal liquefaction, 8:53360 (J;US)
Electron Spectroscopy
Role of d-electrons in chemisorption and metal/support interactions studied by electron spectroscopy. Progress report, January 15, 1983-January 14, 1984, 8:55112 (R;US)
TLD (DOSEMETERS)
See THERMOLUMINESCENT DOSEMETERS
TLD (DOSIMETRY)
See THERMOLUMINESCENT DOSIMETRY
TLD SYSTEMS
See THERMOLUMINESCENT DOSEMETERS
TMPN
See ORGANIC OXYGEN COMPOUNDS
TMR REACTORS
Thermonuclear Ignition
General ignition requirements in TMR's with drift pumping, 8:55248 (R;US)
TMX DEVICES
Cyclotron Instability
Ion microstability in tandem mirrors, 8:55250 (R;US)
ECR Heating
Task II: ECRH and transport modeling in tandem mirrors and divertor physics. Annual progress report on fusion plasma theory, January 1, 1983-December 31, 1983, 8:55241 (R;US)
Equilibrium
Three-dimensional equilibrium in quadrupole symmetric tandem mirrors in the paraxial limit (reduced MHD), 8:55249 (R;US)
Magnet Coils
Physics considerations for tandem-mirror magnet design, 8:55314 (R;US)
Reviews
Status of tandem-mirror confinement, 8:55251 (R;US)
TMX-U experimental results, 8:55247 (R;US)
Vacuum Systems
Vacuum measurements on the Tandem Mirror Experiment Upgrade (TMX-U) fusion experiment, 8:55311 (R;US)
TNT
Detonations
Anomalous burning rate characteristics of composition B and TNT, 8:54853 (RA;US)
Detonation properties of condensed explosives calculated with an equation of state based on intermolecular potentials, 8:54838 (RA;US)
Development of a single species equation of state for detonation products suitable for hydrocode calculations, 8:54840 (RA;US)
Ignition of solid high explosive by the rapid compression of an adjacent gas layer, 8:54786 (RA;US)
Investigation of transient processes at initiation of high explosives, 8:54816 (RA;US)
Shock ignition sensitivity of multiply-shocked pressed TNT, 8:54854 (RA;US)
Shock initiation in gap test configurations, 8:54808 (RA;US)
Sensitivity
Effect of base gaps on setback-shock sensitivities of cast composition B and TNT as determined by the NSWC setback-shock simulator, 8:54855 (RA;US)
Ignition of solid high explosive by the rapid compression of an adjacent gas layer, 8:54786 (RA;US)
Shock ignition sensitivity of multiply-shocked pressed TNT, 8:54854 (RA;US)
Shock initiation in gap test configurations, 8:54808 (RA;US)
TOBACCO PLANT
See NICOTIANA
TOKAMAK DEVICES
See also PDX DEVICES
TEXT DEVICES
Beta Ratio
Review of the beta situation, 8:55236 (R;US)
ECR Heating
Culham ECRH, 8:55238 (RA;US)
ECRH system at 28 GH/sub z/ on THOR tokamak, 8:55266 (RA;US)
Magnetohydrodynamics
Finite-aspect-ratio MHD equations for tokamaks, 8:55319 (J;AT)
TOKAMAK FUSION TEST REACTOR
See TFTR REACTORS
TOKAMAK TYPE REACTORS
See also DOUBLET REACTORS
INTOR TOKAMAK
ISX TOKAMAK
PLT DEVICES
TFTR REACTORS
Alpha Detection
Technical progress report on the TFTR alpha extraction and measurement project, 8:55242 (R;US)
Current-Drive Heating
Parametric study of LH current drive for FED-A, 8:55237 (R;US)
Design
Low-activation fusion-reactor design studies, 8:55291 (R;US)
Nuclear design of a very-low-activation fusion reactor, 8:55289 (R;US)
Limiters
Articulated limiter blade for a tokamak fusion reactor (Patent), 8:55321 (P;US)
Lower Hybrid Heating
Parametric study of LH current drive for FED-A, 8:55237 (R;US)
Magnet Coils
Minimum-thickness low-activation toroidal field coil concept for tokamak reactors, 8:55290 (R;US)

Microwave Equipment
ETR transmission systems, 8:55272 (RA;US)
Radioactivation
Low-activation fusion-reactor design studies, 8:55291 (R;US)
Nuclear design of a very-low-activation fusion reactor, 8:55289 (R;US)
TOKYO SYNCHROTRON
1.3-Gev electron synchrotron.
Beam Monitors
Calibration of the energy indicator system of INS 1.3 GeV electron synchrotron, 8:54609 (R;JP;In Japanese)
CAMAC System
Subsidiary FORTRAN subroutines at INS CAMAC system, 8:54608 (R;JP;In Japanese)
TOTAL-ABSORPTION SPECTROMETERS
See SHOWER COUNTERS
TOXIC MATERIALS
Bibliographies
Chemical selection methods: an annotated bibliography - second edition. Toxics integration information series (final), 8:55344 (R;US)
Information Systems
Problems involved in the computer identification of replicate entries in TOXLINE, 8:55330 (R;US)
TPC
See PROJECTION SPARK CHAMBERS
TRACK DETECTORS (DIELECTRIC)
See DIELECTRIC TRACK DETECTORS
TRACKS
See PARTICLE TRACKS
TRAINING-RESEARCH REACTOR KYOTO
See KUR REACTOR
TRAINS
Computer Codes
LASP: Locomotive Analysis Software Package. Software, 8:54154 (R;US)
Locomotive data acquisition package. Volume 5. Locomotive Analysis Software Package: user's guide. Final report Apr 81-Jan 82, 8:54153 (R;US)
Performance
LASP: Locomotive Analysis Software Package. Software, 8:54154 (R;US)
Performance Testing
Locomotive data acquisition package. Volume 5. Locomotive Analysis Software Package: user's guide. Final report Apr 81-Jan 82, 8:54153 (R;US)
TRANSDUCERS
Design
Apparatus and method for generating mechanical waves, 8:54480 (P;US)
Electromechanics
Apparatus and method for generating mechanical waves, 8:54480 (P;US)
TRANSFER (HEAT)
See HEAT TRANSFER
TRANSFER (IN ENVIRONMENT)
See RADIONUCLIDE MIGRATION
TRANSFER (IN ORGANISM)
See RADIONUCLIDE KINETICS
TRANSFORMATIONS (PHASE)
See PHASE TRANSFORMATIONS
TRANSFORMERS
Research Programs
Compact gas-insulated transformer. Fourteenth quarterly report, 8:53854 (R;US)
TRANSIENTS
Heat Transfer
PARET code and the analysis of the SPERT I transients, 8:54017 (R;US)
Hydraulics
PARET code and the analysis of the SPERT I transients, 8:54017 (R;US)
TRANSITION ELEMENT ALLOYS
Volume
Volume effects in transition metal alloying, 8:54251 (J;US)
TRANSITION ELEMENT COMPLEXES
See also COBALT COMPLEXES
IRON COMPLEXES
MANGANESE COMPLEXES
OSMIUM COMPLEXES
RHENIUM COMPLEXES
RHODIUM COMPLEXES
RUTHENIUM COMPLEXES
VANADIUM COMPLEXES
Chemical Reactions
Rate constants for the decay and reactions of the lowest electronically excited singlet state of molecular oxygen in solution, 8:54343 (J;US)
Photochemical Reactions
Photochemistry of mixed-metal bimetalic complexes containing pentacyanoferrate(II) or pentaammineruthenium(II) metal centers. Evidence for some intramolecular energy-transfer reactions, 8:54340 (J;US)
Photochemistry
Photochemistry of mixed-metal bimetalic complexes containing pentacyanoferrate(II) or pentaammineruthenium(II) metal centers. Evidence for some intramolecular energy-transfer reactions, 8:54340 (J;US)
Visible Spectra
Photochemistry of mixed-metal bimetalic complexes containing pentacyanoferrate(II) or pentaammineruthenium(II) metal centers. Evidence for some intramolecular energy-transfer reactions, 8:54340 (J;US)
TRANSITION ELEMENTS
See also CHROMIUM
COBALT
COPPER
GOLD
IRON
MANGANESE
MOLYBDENUM
NICKEL
NIOBIUM
SILVER
TANTALUM
TECHNETIUM
TITANIUM
VANADIUM
ZIRCONIUM
Atom Transport
Study of mechanism of hydrogen diffusion in separation devices. Progress report for 1980-1983, 8:53730 (R;US)
TRANSITION METALS
See TRANSITION ELEMENTS
TRANSITIONS (PHASE)
See PHASE TRANSFORMATIONS
TRANSMISSION ELECTRON MICROSCOPY
Technique for examining the fuel/cladding interface by TEM, 8:53897 (R;US)
TRANSMISSION (ENERGY)
See ENERGY TRANSPORT
TRANSMISSION (HEAT)
See HEAT TRANSFER
TRANSMISSION LINES
See POWER TRANSMISSION LINES
TRANSPIRATION
Use for botanical systems only.
Tracer Techniques
Use of isotopes in the study of plant water relations, 8:54994 (RA;XA)
TRANSPORT
Limited to the movement of goods and persons.
See also WASTE TRANSPORTATION
Safety
Transport containers for dangerous goods, 8:53745 (BA;DE;In German)
Tanks
Transport containers for dangerous goods, 8:53745 (BA;DE;In German)
TRANSPORT (ENERGY)
See ENERGY TRANSPORT
TRANSPORT (GAMMA)
See PHOTON TRANSPORT
TRANSPORT (IN ORGANISMS)
See RADIONUCLIDE KINETICS
TRANSPORT (NEUTRON)
See NEUTRON TRANSPORT

TRANSPORT (PHOTON)
See PHOTON TRANSPORT
TRANSPORT REGULATIONS
Compliance
Controls necessary to assure regulatory compliance on radioactive material shipments, 8:53519 (RA;US)
Implementation
Implementation of HM-164: an historical perspective, 8:53551 (RA;US)
Modifications
1984 revision of IAEA transport regulations, 8:53478 (RA;US)
TRANSPORTATION SECTOR
Energy Efficiency
Energy-conservation programs, State Department of Transportation, 8:54150 (RA;US)
Health Hazards
Health impacts of productive conservation in urban transportation. Tapcut technical memorandum No. 27, 8:54149 (R;US)
Pollution Sources
Health impacts of productive conservation in urban transportation. Tapcut technical memorandum No. 27, 8:54149 (R;US)
TRANSPORTATION SYSTEMS
See also MASS TRANSIT SYSTEMS
RAPID TRANSIT SYSTEMS
Comparative Evaluations
Florida statewide coal-conversion study: coal-supply and transportation analysis, 8:53859 (R;US)
Computerized Simulation
Use of computers for meeting future challenges in traffic management, 8:53547 (RA;US)
Economic Analysis
Florida statewide coal-conversion study: coal-supply and transportation analysis, 8:53859 (R;US)
Feasibility Studies
Florida statewide coal-conversion study: coal-supply and transportation analysis, 8:53859 (R;US)
Mathematical Models
Florida statewide coal-conversion study: coal-supply and transportation analysis, 8:53859 (R;US)
Performance Testing
Design and testing of scale model transport systems, 8:53552 (RA;US)
Planning
Planning a transportation system for US defense transuranic waste, 8:53554 (RA;US)
Scale Models
Design and testing of scale model transport systems, 8:53552 (RA;US)
TRANSURANIUM ELEMENTS
See also PLUTONIUM
Biogeochemistry
Ecological Research Division Marine Research Program, 8:54951 (R;US)
Decay
Fifth research coordination meeting on the measurement and evaluation of transactinium isotope nuclear data. Central Bureau for Nuclear Measurements, Geel, Belgium, 1-3 September 1982. Summary report, 8:55195 (R;XA)
TRANSURANIUM WASTES
See ALPHA-BEARING WASTES
TRAVELLING IONOSPHERIC DISTURBANCE
Interaction between ionization and gravity waves in the upper atmosphere, 8:55101 (R;XA)
TREES
See also EUCALYPTUSES
HEVEA
OIL PALMS
OLIVE TREES
PINES
Moisture Gages
Applications of neutron moisture depth probes in tree research, 8:54989 (RA;XA)
Transpiration
Use of isotopes in the study of plant water relations, 8:54994 (RA;XA)
1,3,5-TRIAMINO-2,4,6-TRINITROBENZENE
See TATB
TRIGA-2-MUSASHI REACTOR
Reactor Noise
Identification of nuclear reactor characteristics by the reactor noise analysis, 8:53943 (RA;JP;In Japanese)
TRIGA-F-DASA REACTOR
See AFRRI REACTOR
TRIGGER CIRCUITS
Triggers, 8:54710 (RA;US)
TRINITROTOLUENE
See TNT
TRIPLET PARTICLES
See QUARKS
TRISTAN PROJECT
See TRISTAN STORAGE RINGS
TRISTAN STORAGE RINGS
Transposable Ring Intersecting STorage Accelerators in Nippon.
Beam Bunching
Calculation on longitudinal instability due to RF cavities, 8:54618 (R;JP)
Instability
Calculation on longitudinal instability due to RF cavities, 8:54618 (R;JP)
Modifications
Alternative longitudinal polarization scheme for tristan, 8:54643 (R;JP)
Orbits
Closed orbit correction in accumulation ring of TRISTAN, 8:54589 (R;JP)
Polarized Beams
Alternative longitudinal polarization scheme for tristan, 8:54643 (R;JP)
Vacuum Systems
Vacuum system of TRISTAN electron ring, 8:54641 (RA;JP;In Japanese)
TRITIATED WATER
See TRITIUM OXIDES
TRITIUM
Breeding
Neutron irradiation and compatibility testing of Li_2O, 8:55283 (R;US)
Monitoring
Tritium monitor with improved gamma-ray discrimination, 8:54750 (P;US)
TRITIUM OXIDES
Monitoring
Tritium monitor with improved gamma-ray discrimination, 8:54750 (P;US)
Road Transport
Evaluation of the radiological risk resulting from road transportation of tritiated water, 8:53491 (RA;US)
TROMBE WALLS
Performance
Passive solar-heating retrofit of a maintenance facility: first-year performance. Research report may 81-jun 82, 8:53804 (R;US)
TRU WASTES
See ALPHA-BEARING WASTES
TRX-1
See REVERSE-FIELD PINCH
TSUKUBA KEK SYNCHROTRON
See KEK SYNCHROTRON
TUBES
For objects of tubular shape; not for DRIFT TUBES, ELECTRON TUBES or IMAGE STORAGE TUBES.
Eddy Current Testing
Improvement of ISI techniques by multi-frequency eddy current testing method for steam generator tube in PWR plant, 8:53875 (R;JP)
TUBES (CONDUITS)
See PIPES
TUFF
Chemical Analysis
Relation of mercury, uranium, and lithium deposits to the McDermitt caldera complex, Nevada-Oregon, 8:53466 (R;US)

TUMORS
See NEOPLASMS
TUNGSTEN ALLOYS
Crystallization
Refractory-metal stabilized amorphous stainless steel. Part 1. Formation and stability of amorphous stainless steel with W or Ti, 8:54249 (J;GB)
Physical Radiation Effects
Comparison of the effect of electron and ion irradiation on crystallization of amorphous alloys (62Fe16Cr8Ni14W; 50Mo50Ni), 8:54235 (RA;US)
TUNGSTEN SULFIDES
Electrochemistry
Electrochemical characterization of p-type semiconducting tungsten disulfide photocathodes: efficient photoreduction processes at semiconductor/liquid electrolyte interfaces, 8:53784 (J;US)
TURBINES
See also WIND TURBINES
Ultrasonic Testing
Progress on ultrasonic flaw sizing in turbine-engine rotor components: bore and web geometries, 8:54534 (R;US)
TURKEY
Coal Industry
Metallurgical coal in the 1980's - facts and prospects, 8:53423 (R;US)
TURKEY POINT-3 REACTOR
Spent Fuel Casks
Experience in spent nuclear reactor fuel cells, 8:53872 (RA;US)
Spent Fuel Elements
Experience in spent nuclear reactor fuel cells, 8:53872 (RA;US)
TURKEY POINT-4 REACTOR
Spent Fuel Casks
Experience in spent nuclear reactor fuel cells, 8:53872 (RA;US)
Spent Fuel Elements
Experience in spent nuclear reactor fuel cells, 8:53872 (RA;US)
TURNOVER (RADIONUCLIDES)
See RADIONUCLIDE KINETICS
TVA
See TENNESSEE VALLEY AUTHORITY
TWO-BODY PROBLEM
Sturm-Liouville Equation
Sturm solutions of two-center problem in quantum mechanics, 8:55226 (R;SU;In Russian)
TWO-PHASE FLOW
Flow Models
Equations governing the liquid-film flow over a plane with heat flux and interfacial phase change, 8:54529 (TG;US)
Forced Convection
Convective heat transfer with a periodic longitudinal heat flux variation, 8:54521 (RA;US)

U

ULTRACOLD NEUTRONS
Neutron Sources
Experimental studies on the production of ultra cold neutrons by using an accelerator neutron source, 8:53732 (R;JP;In Japanese)
ULTRASONIC MACHINING
Ultrasonic-impact grinder system, 8:54481 (P;US)
ULTRASONIC TESTING
Elastic-wave scattering from multiple voids (porosity), 8:54536 (R;US)
Inverse Born Approximation: exact determination of shape of convex voids, 8:54532 (R;US)
Ultrasonic testing of austenitic stainless steel welds, 8:54541 (R;JP)
Born Approximation
Elastic-wave inverse scattering in non-destructive evaluation, 8:54531 (R;US)
Corrections
Analytic diffraction corrections to ultrasonic scattering measurements, 8:54535 (R;US)
Inclusions
Ultrasonic 3-D reconstruction of inclusions in solids using the inverse Born algorithm, 8:54533 (R;US)
Inverse Scattering Problem
Elastic-wave inverse scattering in non-destructive evaluation, 8:54531 (R;US)
ULTRASONIC WAVES
Damping
Tunable damper for an acoustic wave guide, 8:54543 (P;US)
Waveguides
Tunable damper for an acoustic wave guide, 8:54543 (P;US)
ULTRASONICS
See ULTRASONIC WAVES
ULTRAVIOLET RADIATION
Delayed Radiation Effects
Skin dose and response for the head and neck in patients irradiated with x-ray for tinea capitis: implications for environmental radioactivity, 8:55012 (RA;US)
UNCERTAINTY
See DATA COVARIANCES
UNDERGROUND EXPLOSIONS
Projects GNOME and SEDAN, the PLOWSHARE program. Technical report 1961-1973, 8:54871 (R;US)
UNDERGROUND FACILITIES
Stress Analysis
Preliminary investigation of the structural influence of entry-entry intersections and inhomogeneous initial-stress fields on repository disposal rooms, 8:53660 (R;US)
UNDERGROUND GASIFICATION
See IN-SITU GASIFICATION
UNDERGROUND HEAT DISTRIBUTION SYSTEMS
See HEAT DISTRIBUTION SYSTEMS
UNDERGROUND MINING
Accidents
Analysis of accidents related to falls of ground in metal and nonmetal mines, 1972-73, 8:55074 (R;US)
Inspection
1980 annual report of the Bavarian Mines Inspectorate, 8:53401 (R;DE;In German)
Lighting Systems
Annual report of the Secretary of Labor under the Federal Mine Safety and Health Act of 1977, fiscal year 1979. Volume 2. Mining health and safety research and development, 8:53403 (R;US)
Regional Analysis
1980 annual report of the Bavarian Mines Inspectorate, 8:53401 (R;DE;In German)
Roof Bolts
Annual report of the Secretary of Labor under the Federal Mine Safety and Health Act of 1977, fiscal year 1979. Volume 2. Mining health and safety research and development, 8:53403 (R;US)
Safety Standards
1980 annual report of the Bavarian Mines Inspectorate, 8:53401 (R;DE;In German)
Strata Control
Annual report of the Secretary of Labor under the Federal Mine Safety and Health Act of 1977, fiscal year 1979. Volume 2. Mining health and safety research and development, 8:53403 (R;US)
Supports
Annual report of the Secretary of Labor under the Federal Mine Safety and Health Act of 1977, fiscal year 1979. Volume 2. Mining health and safety research and development, 8:53403 (R;US)
UNIFIED-FIELD THEORIES
Prior to March 1983 this concept was indexed to EINSTEIN-SCHROEDINGER THEORY or UNIFIED GAUGE MODELS.
Supersymmetry
Theoretical perspective for baryon number violation, 8:55144 (RA;US)
UNION OF SOVIET SOCIALIST REPUBLICS
See USSR
UNIPOLAR TRANSISTORS
See FIELD EFFECT TRANSISTORS

UNITED KINGDOM
Occupational Safety
Proposed UK legislation to provide radiological protection for workers, with emphasis on its application to the transport of radioactive materials, 8:53511 (RA;US)

UNITED STATES OF AMERICA
See USA

UPTAKE
See also ROOT ABSORPTION
Mathematical Models
Applicability of the ^{14}C-specific activity model, 8:55061 (J;GB)

URANIUM
See also URANIUM-ALPHA
URANIUM-BETA
URANIUM-GAMMA
Biogeochemistry
Ecological Research Division Marine Research Program, 8:54951 (R;US)
Biological Radiation Effects
Lung cancer among workers at a uranium processing plant, 8:55029 (RA;US)
Emission Spectroscopy
Emission spectrographic carrier distillation technique for the determination of trace elements in nuclear fuel materials, 8:53471 (R;PK)
Geochemistry
Validation of the WATEQ4 geochemical model for uranium, 8:53675 (R;US)
Joints
Hierarchical trees for accelerated aging studies, 8:54204 (R;US)
Multi-Element Analysis
Contribution to ASTM C-26.05 Task Group: determination of impurities in uranium by ICP-AES after separation with TBP, 8:54303 (R;US)

URANIUM 238
Radioecological Concentration
Radiological impact of the operation of coal-fired power stations within Australia, 8:53365 (RA;AU)

URANIUM 238 TARGET
Argon 40 Reactions
Calculation of fusion cross sections, 8:55175 (R;DD;In German)
Neon 22 Reactions
Calculation of fusion cross sections, 8:55175 (R;DD;In German)
Neutron Reactions
Parity nonconservation in neutron resonances (0.88 eV ^{81}Br, 4.53 eV ^{111}Cd, 1.33 eV ^{117}Sn, 0.75 eV ^{139}La neutron resonances), 8:55180 (R;SU;In Russian)
Nitrogen 14 Reactions
Calculation of fusion cross sections, 8:55175 (R;DD;In German)

URANIUM BASE ALLOYS
Pyrochemical Reprocessing
Process for recovering niobium from uranium-niobium alloys, 8:53687 (P;US)

URANIUM COMPLEXES
Structural Chemical Analysis
Raman spectrometric studies of actinide(V) and -(VI) complexes in aqueous sodium carbonate solution and of solid sodium actinide(V) carbonate compounds, 8:54350 (J;US)

URANIUM DEPOSITS
Bibliographies
Bibliography of Utah radioactive occurrences. Volume I, 8:53464 (R;US)
Bibliography of Utah radioactive occurrences. Volume II, 8:53465 (R;US)
Prospecting
Bibliography of Utah radioactive occurrences. Volume I, 8:53464 (R;US)
Bibliography of Utah radioactive occurrences. Volume II, 8:53465 (R;US)

URANIUM DIOXIDE
Fabrication
Fabrication of UO_2-stainless steel fuel for a fast-reactor safety test, 8:54020 (R;US)
Hot Pressing
Mechanisms of elevated-temperature rupture in single-phase ceramics. Progress report, February 1, 1983-January 31, 1984, 8:54254 (R;US)
Oxidation
Hydrogen-generating reactions in LWR severe accidents, 8:54019 (R;US)
Sintering
Mechanisms of elevated-temperature rupture in single-phase ceramics. Progress report, February 1, 1983-January 31, 1984, 8:54254 (R;US)
Swelling
Mechanisms of elevated-temperature rupture in single-phase ceramics. Progress report, February 1, 1983-January 31, 1984, 8:54254 (R;US)
Swelling and gas release of grain-boundary pores in uranium dioxide, 8:54255 (R;US)

URANIUM HEXAFLUORIDE
Packaging
Packaging of US Department of Energy toll enriched UF_6: experience, responsibilities, and improvements, 8:54464 (RA;US)
Phase Studies
Physical properties of uranium hexafluoride. Part A. Phase equilibria, 8:54346 (R;CS)
Rail Transport
Cost effectiveness of safety measures applying to natural uranium hexafluoride transportation in France, 8:53694 (RA;US)
Road Transport
Cost effectiveness of safety measures applying to natural uranium hexafluoride transportation in France, 8:53694 (RA;US)
Thermal Conductivity
Behaviour of UF_6 package in fire: comparison of calculations with experiment, 8:54415 (RA;US)

URANIUM MILLS
See FEED MATERIALS PLANTS

URANIUM MINES
Decommissioning
Characterization of nuclear fuel cycle facilities requiring decommissioning and decontamination, 8:53632 (RA;US)
Decontamination
Characterization of nuclear fuel cycle facilities requiring decommissioning and decontamination, 8:53632 (RA;US)
Environmental Impact Statements
Final environmental statement related to the operation of the Teton Uranium ISL Project (Docket No. 40-8781, 8:54961 (R;US)
Health Hazards
Mortality followup through 1977 of the white underground uranium miners cohort examined by the US Public Health Service, 8:53692 (RA;US)
Studies of Grants, New Mexico, uranium miners: status as of December, 1982, 8:55033 (RA;US)
Use of PRIM code to analyze potential radiation-induced genetic and somatic effects to man from Jackpile-Paguate mines, 8:55030 (RA;US)
Radon
Study of radon emanation from waste rock at Northern Territory uranium mines, 8:53604 (RA;AU)

URANIUM ORES
Marketing
1982 survey of United States uranium marketing activity, 8:53600 (R;US)
Meteorology
Atmospheric dispersion of radon gas from a shallow, extended uranium ore body, 8:53467 (RA;AU)
Radon
Atmospheric dispersion of radon gas from a shallow, extended uranium ore body, 8:53467 (RA;AU)

URANIUM OXIDES
See also URANIUM DIOXIDE

Multi-Element Analysis
Contribution to ASTM C-26.05 Task Group: determination of impurities in uranium by ICP-AES after separation with TBP, 8:54303 (R;US)
URANIUM TETRAFLUORIDE
Purification
Method for the recovery of uranium values from uranium tetrafluoride, 8:53472 (P;US)
URANIUM-ALPHA
Permeability
Impurities diffusion in uranium: cobalt diffusion, 8:54212 (R;SU;In Russian)
URANIUM-BETA
Permeability
Impurities diffusion in uranium: cobalt diffusion, 8:54212 (R;SU;In Russian)
URANIUM-GAMMA
Permeability
Impurities diffusion in uranium: cobalt diffusion, 8:54212 (R;SU;In Russian)
URANYL COMPOUNDS
See also AUC
URANYL NITRATES
Skin Absorption
Effects of uranium compounds on skin. Final report for the period 1 July 1980 - 31 October 1982, 8:55043 (R;XA)
URANYL NITRATES
Skin Absorption
Effects of uranium compounds on skin. Final report for the period 1 July 1980 - 31 October 1982, 8:55043 (R;XA)
URBAN AREAS
Fuel Cell Power Plants
Fuel cells for power plants, 8:54118 (RA;US)
UREA
Uptake
Uptake of ^{15}N labelled urea and ammonium nitrate by 4-year old Douglas-fir grown in sand-peat mix, 8:54986 (RA;XA)
US BUREAU OF MINES
Bureau of Mines coal mining, health and safety, research and development. 1975 annual report and achievements, 8:53404 (R;US)
Coal Mining
Bureau of Mines coal mining health and safety research and development. 1976 annual report and achievements, 8:53408 (R;US)
US DOE
See also BNL
HANFORD RESERVATION
HAPO
IDAHO CHEMICAL PROCESSING PLANT
LASL
MORGANTOWN ENERGY TECHNOLOGY CENTER
ORNL
ROCKY FLATS PLANT
SANDIA LABORATORIES
SAVANNAH RIVER PLANT
STANFORD LINEAR ACCELERATOR CENTER
US MSHA
Emergency Plans
Energy emergency handbook, 8:54055 (R;US)
Energy Policy
Florida statewide coal-conversion study: coal-supply and transportation analysis, 8:53859 (R;US)
Nuclear Facilities
DOE health and mortality study at Oak Ridge, 8:55009 (RA;US)
Program Management
DOE renewable energy program, 8:54110 (R;US)
Renewable Energy Sources
DOE renewable energy program, 8:54110 (R;US)
US EPA
Research Programs
Assessment of cold-climate environmental research priorities, 8:54062 (R;US)
US MSHA
Inspection
Annual report of the Secretary of Labor under the Federal Mine Safety and Health Act of 1977, fiscal year 1980. Volume 1, 8:53405 (R;US)
Annual report of the Secretary of Labor under the Federal Mine Safety and Health Act of 1977, fiscal year 1979. Volume 1, 8:53402 (R;US)
Regulations
Annual report of the Secretary of Labor under the Federal Mine Safety and Health Act of 1977, fiscal year 1980. Volume 1, 8:53405 (R;US)
Annual report of the Secretary of Labor under the Federal Mine Safety and Health Act of 1977, fiscal year 1979. Volume 1, 8:53402 (R;US)
US NBS
Research Programs
Evaluative report on the Institute for Materials Research, National Bureau of Standards - fiscal year 1976. Annual report, 8:54202 (R;US)
Evaluative report on the Institute for Materials Research, National Bureau of Standards - fiscal year 1977. Annual report, 8:54203 (R;US)
US NBS REACTOR
See NBSR REACTOR
US NRC
United States Nuclear Regulatory Commission-prior to 1975 was part of US AEC.
Nuclear Facilities
Title list of documents made publicly available, June 1-30, 1983. Volume 5 No. 6, 8:53907 (R;US)
USA
See also FEDERAL REGION I
FEDERAL REGION V
FEDERAL REGION VII
FEDERAL REGION VIII
FEDERAL REGION X
Coal Industry
Metallurgical coal in the 1980's - facts and prospects, 8:53423 (R;US)
Dry Storage
Role of dry storage as a means to meet national storage needs in the United States, 8:53597 (BA;XN)
International Cooperation
US-West European energy and security relations, 8:54088 (R;US)
Legislation
Annual report and achievements 1976, 8:53407 (R;US)
Mining Laws
Annual report and achievements 1975, 8:53406 (R;US)
Annual report and achievements 1976, 8:53407 (R;US)
Nuclear Power Plants
Population dose commitments due to radioactive releases from nuclear power plant sites in 1980, 8:53952 (R;US)
Regulatory licensing status summary report. Volume 12, No. 8. Nuclear power plants data for decisions (blue book), August 1-August 31, 1983, 8:53908 (R;US)
Research Reactors
Current status of the US RERTR Program, 8:53963 (R;US)
Security
US-West European energy and security relations, 8:54088 (R;US)
Terminal Facilities
Florida statewide coal-conversion study: coal-supply and transportation analysis, 8:53859 (R;US)
USSR
Lasers
Bibliography of soviet laser developments, number 58, March-April 1982, 8:54503 (R;US)
Research Programs
Bibliography of Soviet laser developments number 57, January-February 1982, 8:54493 (R;US)
UTAH
Oil Sand Deposits
Tar sand resources of Utah, 8:53452 (RA;US)
Radioactive Minerals
Bibliography of Utah radioactive occurrences. Volume I, 8:53464 (R;US)
Bibliography of Utah radioactive occurrences. Volume II, 8:53465 (R;US)

Salt Deposits
Overview of the regional geology of the Paradox Basin Study Region, 8:53658 (R;US)
Uranium Deposits
Bibliography of Utah radioactive occurrences. Volume I, 8:53464 (R;US)
Bibliography of Utah radioactive occurrences. Volume II, 8:53465 (R;US)

UTERINE CERVIX CARCINOMA
See CARCINOMAS

UTILITIES
See ELECTRIC UTILITIES
GAS UTILITIES
PUBLIC UTILITIES

V

VACUUM GAGES
Design
New small gauge for ultra high vacuum, 8:54547 (RA;JP;In Japanese)
Performance
Characteristics of three-grid type modulated Bayard-Alpert ionization gauge in ultra high vacuum region, 8:54548 (RA;JP;In Japanese)
New small gauge for ultra high vacuum, 8:54547 (RA;JP;In Japanese)
Ultrahigh Vacuum
Characteristics of three-grid type modulated Bayard-Alpert ionization gauge in ultra high vacuum region, 8:54548 (RA;JP;In Japanese)

VACUUM SYSTEMS
Computerized Simulation
Simulation of acoustic delay line (ADL) system for light pipe in the radiated light facility by computer and analog circuits, 8:54549 (RA;JP;In Japanese)
Surface Cleaning
Manufacture of superhigh vacuum testing tank, 8:54546 (RA;JP;In Japanese)
Windows
344 cm x 86 cm low mass vacuum window, 8:54620 (R;US)

VALENCE ELECTRONS
See ELECTRONS

VALUES
Evaluation
Two types of values and their assessment by the collective interest, 8:54059 (R;US)

VALVES
Design
Liquid-blocking check valve, 8:54483 (P;US)
Valve for controlling solids flow, 8:53932 (P;US)

VANADIUM
Electric Conductivity
Electrical resistivity of vanadium and zirconium. State-of-the-art report, 8:54207 (R;US)
Proton Reactions
Deuteron production in proton-nucleus interactions at 7.5 GeV/c, 8:55183 (R;SU;In Russian)
Thermal Conductivity
Analysis of thermal conductivity data for fourteen elements in normal and superconducting states. State-of-the-art report, 8:54206 (R;US)
Transition Temperature
Analysis of thermal conductivity data for fourteen elements in normal and superconducting states. State-of-the-art report, 8:54206 (R;US)

VANADIUM BASE ALLOYS
Oxidation
In-situ oxidation studies of vanadium-20% titanium alloy, 8:54223 (RA;US)

VANADIUM COMPLEXES
Chemical Reactions
Kinetics and mechanism of the oxidation of hexaaquovanadium(II) ions by aliphatic radicals, 8:54314 (J;US)

VANADIUM MINERALS
See MINERALS

VAPORS
See also WATER VAPOR
Monitoring
Apparatus and method for quantitative determination of materials contained in fluids, 8:54889 (P;US)

VAVILOV-CHERENKOV RADIATION
See CHERENKOV RADIATION

VEGETABLES
Edible parts of plants only; see also FRUITS.
Radionuclide Kinetics
Levels of strontium 90 in the environment at PINSTECH (Period 1979-1980), 8:54927 (R;PK)

VEGETATION
See PLANTS

VELOCIMETERS
Interferometers
VISAR: some things you should know, 8:54763 (R;US)

VENTILATION DUCTS
See DUCTS

VESSELS
See CONTAINERS

VESSELS (CHEMICAL REACTIONS)
See CHEMICAL REACTORS

VESSELS (PRESSURE)
See PRESSURE VESSELS

VISITOR CENTERS
See PUBLIC BUILDINGS

VITRINITE
See MACERALS

VOIDS
Shape
Inverse Born Approximation: exact determination of shape of convex voids, 8:54532 (R;US)
Ultrasonic Testing
Elastic-wave scattering from multiple voids (porosity), 8:54536 (R;US)

VOLTAIC CELLS
See ELECTRIC BATTERIES

VOLTMETERS
Amplifiers
Precision absolute-value amplifier for a precision voltmeter, 8:54773 (P;US)

W

WAGR REACTOR
Coolants
Use of chromel-alumel thermocouples in high temperature experiments in WAGR, 8:53879 (R;XA)
Fuel Cans
Use of chromel-alumel thermocouples in high temperature experiments in WAGR, 8:53879 (R;XA)
Fuel Pins
Fuel temperature measurement in the WAGR, 8:53880 (R;XA)
Power Distribution
Wide range in-core neutron measurement system used in the Windscale AGR concluding experiments, 8:53882 (R;XA)
Reactor Decommissioning
Decommissioning of the Windscale Advanced Gas-Cooled Reactor, 8:54005 (RA;US)
Reactor Dismantling
Decommissioning of the Windscale Advanced Gas-Cooled Reactor, 8:54005 (RA;US)

WASTE DISPOSAL
See also RADIOACTIVE WASTE DISPOSAL
SANITARY LANDFILLS
Pollution Control
Remedial actions at hazardous waste sites: survey and case studies. Final report, 8:54942 (R;US)

WASTE HEAT
District Heating
Industrial waste heat for district heating, 8:54075 (J;US)
Surveys
Industrial waste heat for district heating, 8:54075 (J;US)
WASTE PROCESSING
See also MATERIALS RECOVERY
RADIOACTIVE WASTE PROCESSING
Pilot Plants
Inhibition of nitrification by chromium in a biodisc system, 8:55068 (R;US)
WASTE PRODUCT UTILIZATION
Economics
Industrial waste exchange: a mechanism for saving energy and money, 8:54074 (R;US)
WASTE SOLUTIONS
See LIQUID WASTES
WASTE TRANSPORTATION
Transportation system preconceptual description for subseabed disposal of high-level waste, 8:53571 (RA;US)
Casks
Economic evaluation of nuclear waste transportation casks, 8:54445 (RA;US)
Cost
Estimated transportation cost and risk for operation of a nuclear waste repository at candidate sites, 8:53555 (RA;US)
Interfaces
WIPP design flexibility for defense TRU waste transportation systems interface, 8:53504 (RA;US)
Risk Assessment
Comparison of transports expected under different waste management concepts: determination of basic data for application in risk analyses, 8:53469 (RA;US)
Estimated transportation cost and risk for operation of a nuclear waste repository at candidate sites, 8:53555 (RA;US)
WASTE TREATMENT
See WASTE PROCESSING
WASTE WATER
Anaerobic Digestion
Energy recovery from pretreatment of industrial wastes in the anaerobic fluidized bed process, 8:54158 (R;US)
Chemical Analysis
Identification and separation of the organic compounds in coal-gasification condensate waters, 8:53371 (R;US)
Decontamination
Process for removal of ammonia and acid gases from contaminated waters, 8:54948 (P;US)
Energy Recovery
Energy recovery from pretreatment of industrial wastes in the anaerobic fluidized bed process, 8:54158 (R;US)
Purification
Purifying contaminated water, 8:53463 (P;US)
Recycling
Control of blackwater in coal preparation plant recycle and discharge. Open file report Oct 79-Sep 82 (final), 8:53390 (R;US)
Waste Management
Environment, safety, and health annual report, fiscal year 1982, 8:53425 (R;US)
Water Treatment
Control of blackwater in coal preparation plant recycle and discharge. Open file report Oct 79-Sep 82 (final), 8:53390 (R;US)
Physical-chemical treatment of tar-sand processing wastewater, 8:53462 (R;US)
WASTE-FUELED BOILERS
See REFUSE-FUELED BOILERS
WASTE-ROCK INTERACTIONS
Geochemical assessment of nuclear waste isolation. Report of activities during fiscal year 1982, 8:53649 (R;US)
Mathematical Models
Chemical transport in a fissured rock: verification of a numerical model, 8:53686 (J;US)
WATER
See also DRINKING WATER
GROUND WATER
SEAWATER
WASTE WATER
Physico-chemical fracturing and cleaning of coal, 8:53412 (R;US)
Chemical Analysis
Application of Kelgraph to electrochemical detectors for flow injection analysis and high performance liquid chromatography. Technical report, 8:54299 (R;US)
Chemical Reaction Yield
Metal hydride catalysis: water formation on exposure of $LaCo_5H$/sub z/ to O_2, 8:54312 (J;US)
Decontamination
Removal of radon from water using granular activated carbon adsorption. Annual report, 8:54300 (R;US)
Photon Collisions
Monte Carlo calculations of initial energies of electrons in water irradiated by photons with energies up to 1 GeV (PHOEL-3 code), 8:55206 (J;GB)
Radiolysis
Water radiolysis study: application to the transportation casks, 8:54386 (RA;US)
WATER CONTENT
See HUMIDITY
WATER COOLANT
See WATER
WATER HEATERS
See also SOLAR WATER HEATERS
Comparative Evaluations
Influence of residential solar water heaters on electric-utility peak demand, 8:53811 (R;US)
Design
Hot water tank for use with a combination of solar energy and heat-pump desuperheating, 8:53812 (P;US)
Energy Consumption
Influence of residential solar water heaters on electric-utility peak demand, 8:53811 (R;US)
Performance
Effect of fuel gas composition on appliance performance. Topical report Jul 78-Dec 82, 8:53447 (R;US)
WATER MODERATED REACTORS
See also BWR TYPE REACTORS
JMTR REACTOR
KUHFR REACTOR
LWBR TYPE REACTORS
PWR TYPE REACTORS
Radiation Heating
Determination of radiation heating in a critical assembly, 8:53916 (R;SU;In Russian)
WATER MODERATOR
See WATER
WATER POLLUTION
Toxicity
Animal-sediment relationships: a case study of the Patapsco River, 8:54955 (R;US)
WATER RESERVOIRS
Environmental Effects
Effects of reservoir releases on water quality, macroinvertebrates, and fish in tailwaters: field study results. Final report, 8:53755 (R;US)
Water Reclamation
Techniques for reaeration of hydropower releases. Final report Oct 80-Apr 82, 8:53756 (R;US)
WATER RESOURCES
Management
Water resources of Manatee County, Florida. Water-resources investigations, 8:54069 (R;US)
WATER RIGHTS
Legal Aspects
Adapting appropriation water law to accommodate equitable consideration of instream flow uses, 8:54959 (R;US)
WATER SATURATION
Computer Calculations
STP: A mathematically and physically consistent library of steam properties, 8:53926 (J;US)
WATER SOURCE HEAT PUMPS
Manufacturers
Influence of corporate strategy on the decision to proceed with district heating: case study of Toledo Edison Company, 8:54184 (R;US)

WATER VAPOR
Photolysis
Photolysis of water vapor on titanium/TiO_2 surfaces, 8:54341 (J;NL)
WATERBORNE PARTICLES
See PARTICULATES
WAVEGUIDES
Antennas and waveguides for electron-cyclotron heating of plasmas, 8:55260 (R;US)
Damping
Tunable damper for an acoustic wave guide, 8:54543 (P;US)
Tuning
Tunable damper for an acoustic wave guide, 8:54543 (P;US)
WAZ 16
See NICKEL BASE ALLOYS
WEATHERIZATION
Residential Buildings
Economic feasibility of alternative utility-sponsored weatherization programs: the case of baltimore gas and electric company. Final report, 8:54141 (R;US)
WECS
See WIND TURBINES
WEINBERG LEPTON MODEL
Higgs Bosons
Observability of heavy Higgs bosons, 8:55156 (J;IT)
WEINBERG MODEL
See WEINBERG LEPTON MODEL
WELDED JOINTS
Failures
Austenitic stainless steel-ferritic steel weld joint failures, 8:54245 (J;US)
Ultrasonic Testing
Ultrasonic testing of austenitic stainless steel welds, 8:54541 (R;JP)
WELDS
See WELDED JOINTS
WELL DRILLING
Cost
Indexes and estimates of domestic well drilling costs, 1982 and 1983, 8:53444 (R;US)
WELL LOGGING EQUIPMENT
To be used only when the equipment itself is the topic of the paper; includes source, detector, and associated equipment.
Design
Wellbore inertial directional surveying system, 8:53436 (P;US)
WENDELSTEIN-7 STELLARATOR
Microwave Equipment
Transmission lines and launching systems for ECRH on the garching stellarators W VIIa and W VII-AS, 8:55276 (RA;US)
WEST GERMANY
See FEDERAL REPUBLIC OF GERMANY
WESTERN AUSTRALIA
Radioactivity
Environmental radiation at the Monte Bello Islands from nuclear weapons tests conducted in 1952 and 1956, 8:54919 (R;AU)
WESTERN EUROPE
See also AUSTRIA
FEDERAL REPUBLIC OF GERMANY
FRANCE
ITALY
SCANDINAVIA
SPAIN
SWITZERLAND
UNITED KINGDOM
Coal Industry
Metallurgical coal in the 1980's - facts and prospects, 8:53423 (R;US)
International Cooperation
US-West European energy and security relations, 8:54088 (R;US)
Security
US-West European energy and security relations, 8:54088 (R;US)
WESTINGHOUSE GASIFICATION PROCESS
Monitoring
Engineering-support services for the DOE/GRI coal-gasification research program. Monthly technical progress report, 27 February-26 March 1982, 8:53335 (R;US)
Process Development Units
Engineering-support services for the DOE/GRI coal-gasification research program. Monthly technical progress report, 27 February-26 March 1982, 8:53335 (R;US)
WET-TYPE COOLING TOWERS
See COOLING TOWERS
WHOLE-BODY COUNTERS
Efficiency
Improved measurement system for the whole body monitor, 8:54664 (RA;AU)
WILDERNESS AREAS
See NATURE RESERVES
WIND
Experimental Data
Regional Wind-Energy-Assessment Program. Progress report, October 1981-September 1982. Appendix. Wind statistic summaries, 8:53844 (R;US)
Monitoring
Candidate wind-turbine generator site cumulative meteorological data summary and data for January 1982 through September 1982, 8:53851 (R;US)
WIND ENERGY CONVERSION SYSTEMS
See WIND TURBINES
WIND GENERATORS
See ELECTRIC GENERATORS
WIND TURBINES
WIND POWER
Aerial Prospecting
Regional Wind-Energy-Assessment Program. Progress report, October 1981-September 1982, 8:53843 (R;US)
Availability
Regional Wind-Energy-Assessment Program. Progress report, October 1981-September 1982, 8:53843 (R;US)
Resource Assessment
Overview of Hawaii's wind-energy program, 8:53842 (RA;US)
Technology Assessment
Overview of Hawaii's wind-energy program, 8:53842 (RA;US)
WIND POWER PLANTS
Planning
Utility-scale wind energy and the Kahuku wind-energy project, 8:53845 (RA;US)
WIND TURBINES
Design
Vortex-augmented cooling tower - windmill combination, 8:53853 (P;US)
Energy Storage
Energy storage for wind-generator application, 8:53849 (R;US)
Mathematical Models
Analytical model for predicting emergency shutdown of a two-bladed horizontal-axis turbine, 8:53848 (R;US)
Monitoring
Commercial wind energy conversion systems (wecs) monitoring and utility impacts study. Final report, 8:53850 (R;US)
Shutdowns
Analytical model for predicting emergency shutdown of a two-bladed horizontal-axis turbine, 8:53848 (R;US)
Site Selection
Candidate wind-turbine generator site cumulative meteorological data summary and data for January 1982 through September 1982, 8:53851 (R;US)
Technology Assessment
Overview of the wind-energy project at Kahuku Seafood Plantation, 8:54108 (RA;US)
WINDSCALE ADVANCED GAS-COOLED REACTOR
See WAGR REACTOR
WOOD
Hydrogenation
Evaluation of hydropyrolysis as an energy-saving alternative to the Tomlinson furnace. Task II. Chemistry of hydropyrolysis, 8:54161 (R;US)

Mass Spectroscopy
Direct mass-spectrometric studies of the pyrolysis of carbonaceous fuels. II. Qualitative observations of primary and secondary processes in biomass, 8:53783 (J;NL)
Pyrolysis
Direct mass-spectrometric studies of the pyrolysis of carbonaceous fuels. II. Qualitative observations of primary and secondary processes in biomass, 8:53783 (J;NL)
Evaluation of hydropyrolysis as an energy-saving alternative to the Tomlinson furnace. Task II. Chemistry of hydropyrolysis, 8:54161 (R;US)
Research Programs
North Carolina Energy Institute. Annual report, 1982, 8:54070 (R;US)
Solar Drying
Drying wood with the sun: how to build a solar-heated firewood dryer, 8:53801 (R;US)

WOOD ALCOHOL
See METHANOL

WOOD PRODUCTS INDUSTRY
See also PAPER INDUSTRY
Energy Consumption
Use of recording watt/varmeter to evaluate the electrical power requirements of a combination edger. General technical report (final), 8:54169 (R;US)
Equipment
Use of recording watt/varmeter to evaluate the electrical power requirements of a combination edger. General technical report (final), 8:54169 (R;US)

WORKERS
See PERSONNEL

WWER TYPE REACTORS
Reactor Cores
BIPRUS code, 8:53937 (R;SU;In Russian)

X

X RADIATION
Delayed Radiation Effects
Skin dose and response for the head and neck in patients irradiated with x-ray for tinea capitis: implications for environmental radioactivity, 8:55012 (RA;US)

XENON
Electron Attachment
Electron-molecule interactions in gases and liquids: the electron-attachment process in gases and nonpolar liquids, 8:55110 (R;US)
Pion Minus Reactions
Neutral pion production in pion-xenon nucleus collisions at 3.5 GeV/c momentum, 8:55185 (R;SU)
Pion Reactions
Study of the incident pion deflection in passing through atomic nucleus, 8:55184 (R;SU)

X-RAY DETECTION
Photocathodes
Bandpass x-ray diode and x-ray multiplier detector, 8:54778 (P;US)

X-RAY DIFFRACTION
Synchrotron Radiation
X-rays from synchrotron: A new challenge for neutron scattering, 8:55205 (J;NL)

X-RAY RADIOGRAPHY
Flash x-ray cineradiography @ 100,000 FPS, 8:54861 (RA;US)
Image Intensifiers
High-speed videography combined with an x-ray image intensifier for dynamic radiography, 8:54538 (R;US)
Pulse Techniques
Survey of flash x-ray techniques and applications, 8:54539 (R;US)
Television Cameras
High-speed videography combined with an x-ray image intensifier for dynamic radiography, 8:54538 (R;US)

X-RAY TUBES
Calibration
Kilovoltage calibration of medical x-ray generators, 8:54970 (RA;AU)

Y

YAYOI REACTOR
Ducts
Measurements of neutron and gamma ray streaming through a duct, (2), (3), 8:53976 (R;JP;In Japanese)

YTTERBIUM
Mass Spectroscopy
Method for quantitative determination and separation of trace amounts of chemical elements in the presence of large quantities of other elements having the same atomic mass, 8:54304 (P;US)

YTTERBIUM 157
Energy Levels
Evolution of nuclear shapes in $^{157-161}$Yb as a function of spin and neutron number, 8:55192 (J;NL)
Nuclear Deformation
Evolution of nuclear shapes in $^{157-161}$Yb as a function of spin and neutron number, 8:55192 (J;NL)

YTTERBIUM 158
Energy Levels
Evolution of nuclear shapes in $^{157-161}$Yb as a function of spin and neutron number, 8:55192 (J;NL)
Nuclear Deformation
Evolution of nuclear shapes in $^{157-161}$Yb as a function of spin and neutron number, 8:55192 (J;NL)

YTTERBIUM 159
Energy Levels
Evolution of nuclear shapes in $^{157-161}$Yb as a function of spin and neutron number, 8:55192 (J;NL)
Nuclear Deformation
Evolution of nuclear shapes in $^{157-161}$Yb as a function of spin and neutron number, 8:55192 (J;NL)

YTTERBIUM 160
Energy Levels
Evolution of nuclear shapes in $^{157-161}$Yb as a function of spin and neutron number, 8:55192 (J;NL)
Nuclear Deformation
Evolution of nuclear shapes in $^{157-161}$Yb as a function of spin and neutron number, 8:55192 (J;NL)

YTTERBIUM 161
Energy Levels
Evolution of nuclear shapes in $^{157-161}$Yb as a function of spin and neutron number, 8:55192 (J;NL)
Nuclear Deformation
Evolution of nuclear shapes in $^{157-161}$Yb as a function of spin and neutron number, 8:55192 (J;NL)

YTTRIUM ALUMINIUM GARNETS
See ALUMINIUM OXIDES

YUGOSLAVIA
Coal Gasification Plants
Fugitive emission testing at the Kosovo coal gasification plant. Final task report Apr 79-Sep 81, 8:53349 (R;US)

Z

ZEOLITES
Ion Exchange
Magnetic, Moessbauer effect, and neutron small angle scattering measurements on iron clusters in A-zeolites, 8:54214 (R;DE;In German)

Iron Ions
Magnetic, Moessbauer effect, and neutron small angle scattering measurements on iron clusters in A-zeolites, 8:54214 (R;DE;In German)
Leaching
Review of DOE waste package program. Subtask 1.1. National waste package program, October 1982-March 1983. Vol. 4, 8:53652 (R;US)
Radiolysis
Review of DOE waste package program. Subtask 1.1. National waste package program, October 1982-March 1983. Vol. 4, 8:53652 (R;US)
ZFK ROSSENDORF
Research Programs
Annual report 1981. Nuclear Fuel Research Department, 8:54205 (R;DD;In German)
Joint annual report 1981, 8:55164 (R;DD;In German)
ZINC
Absorption Spectroscopy
Development of preconcentration techniques for the determination of cadmium, copper, lead and zinc in sea water in conjunction with flame atomic absorption spectrophotometry, 8:54298 (R;TH)
Activation Analysis
Elemental composition of human and animal milk. A review. A report prepared under the auspices of the IAEA in collaboration with the WHO, 8:54983 (R;XA)
Ecological Concentration
Incidence of heavy metals in street surface sediments: solubility and grain size studies, 8:54917 (J;NL)
Trace metals in tropical river environment--distribution, 8:54945 (J;NL)
Trace metals in tropical river environment--speciation and biological transfer, 8:54946 (J;NL)
Spectrophotometry
Development of preconcentration techniques for the determination of cadmium, copper, lead and zinc in sea water in conjunction with flame atomic absorption spectrophotometry, 8:54298 (R;TH)
Thermal Conductivity
Analysis of thermal conductivity data for fourteen elements in normal and superconducting states. State-of-the-art report, 8:54206 (R;US)
Transition Temperature
Analysis of thermal conductivity data for fourteen elements in normal and superconducting states. State-of-the-art report, 8:54206 (R;US)
ZINC OXIDES
Catalytic Effects
Hydrous metal oxide ion exchangers as hydrogenation catalysts for direct coal liquefaction, 8:53360 (J;US)
Solid-state, surface, and catalytic properties of oxides. Progress report, October 1, 1982-August 31, 1983, 8:54306 (R;US)
Sorptive Properties
Solid-state, surface, and catalytic properties of oxides. Progress report, October 1, 1982-August 31, 1983, 8:54306 (R;US)
ZINC SELENIDES
Microstructure
High voltage high resolution electron microscopy of compound semiconductors, 8:54278 (RA;US)
ZINC TELLURIDES
Microstructure
High voltage high resolution electron microscopy of compound semiconductors, 8:54278 (RA;US)
ZIRCONIUM
Electric Conductivity
Electrical resistivity of vanadium and zirconium. State-of-the-art report, 8:54207 (R;US)
Oxidation
Hydrogen-generating reactions in LWR severe accidents, 8:54019 (R;US)
Physical Radiation Effects
Electron damage in Zr and Ti, 8:54228 (RA;US)
ZIRCONIUM 90 TARGET
Pion Reactions
Study of isovector resonances with pion charge exchange, 8:55177 (J;NL)
ZIRCONIUM ALLOYS
Physical Radiation Effects
Migration of interstitials in βNb-Zr alloys during electron irradiation by using a high voltage electron microscope, 8:54229 (RA;US)
ZIRCONIUM OXIDES
Deposition
Microstructure control for sputter-deposited ZrO_2, ZrO_2 CaO and ZrO_2 Y_2O_3, 8:54262 (J;CH)

CONTRACT NUMBER INDEX

Numbers assigned to DOE contracts under which documents announced in this publication were prepared are included in this index.

Contract No.	Abstract No.	Report No.
AC01-78AD06185	Faucett (Jack) Associates, Inc., Chevy Chase, MD (USA)	
	8:54055	DOE/AD/06185—T1
AC01-78CS35147	USDOE Technical Information Center, Oak Ridge, TN	
	8:53778	MTR—80W00022
	Mitre Corp., McLean, VA (USA). METREK Div.	
	8:53791	DOE/CS/35147—T1
AC01-78ET10324	Kellogg (M.W.) Co., Houston, TX (USA)	
	8:53335	DOE/ET/10324—T55
AC01-78ET11041	Suntech, Inc., Marcus Hook, PA (USA). Applied Research Dept.	
	8:53460	DOE/ET/11041—T1
AC01-78ET23089	Science Applications, Inc., McLean, VA (USA)	
	8:53774	DOE/ET/23089—T2
AC01-79CS20192	Resource Planning Associates, Inc., Cambridge, MA (USA)	
	8:54184	DOE/CS/20192—T3
AC01-79CS20531	Harbridge House, Inc., Washington, DC (USA)	
	8:54137	DOE/CS/20531—T8
AC01-79ET29365	Purdue Univ., Lafayette, IN (USA). School of Electrical Engineering	
	8:53855	TR-EE—83-25
AC01-80CS24312	CSI Resource Systems, Inc., Washington, DC (USA)	
	8:54185	DOE/CS/24312—7
AC01-80CS40402	Centec Corp., Reston, VA (USA)	
	8:54162	DOE/CS/40402—16
AC01-80ET15295	Hoffman-Holt, Inc., Silver Spring, MD (USA)	
	8:53384	DOE/ET/15295—T1
AC01-80ET20647	Meridian Corp., Falls Church, VA (USA)	
	8:54110	DOE/ET/20647—T1
AC01-80RA50259	Polysystems Analysis Corp., Huntington, NY (USA)	
	8:54073	DOE/RA/50259—T5
	8:54098	DOE/RA/50259—T2
	8:54099	DOE/RA/50259—T3
	8:54100	DOE/RA/50259—T4
	8:54101	DOE/RA/50259—T6
AC01-82CE15095	National Center for Appropriate Technology, Butte, MT (USA)	
	8:53801	DOE/CE/15095—3
AC02-76CH00016	Brookhaven National Lab., Upton, NY (USA)	
	8:53412	BNL—33539
	8:53652	NUREG/CR—2482-Vol.4
	8:53653	NUREG/CR—3091-Vol.2
	8:53734	BNL—51686
	8:53737	BNL-tr—1006(Feb 1982).
	8:53788	BNL—51599
	8:53867	BNL—33518
	8:53985	BNL-NUREG—33530
	8:53986	BNL-NUREG—33574
	8:54083	BNL—33533
	8:54090	BNL—51568
	8:54146	
	8:54149	BNL—51575
	8:54208	BNL—33666
	8:54246	BNL-tr—1009(1982).
	8:54251	Acta Metallurgica 30 1941-1955 (1982).
	8:54284	
	8:54290	Journal of Electronic Materials 11 NO. 5. 869-882 (1982).
	8:54291	BNL—33597
	8:54339	Journal of the American Chemical Society 105 NO. 12. 3837-3843 (15 Jun 1983).
	8:54374	BNL—33590
	8:54375	BNL—33592
	8:54376	BNL—33593
	8:54490	BNL-tr—1005(1979).
	8:54575	BNL—33532
	8:54576	BNL—33535
	8:54596	BNL—33116
	8:54597	BNL—33536
	8:54631	BNL—32362
	8:54632	BNL—33487
	8:54633	BNL—33591
	8:54634	BNL—33651
	Lawrence Berkeley Lab., CA (USA)	
	8:54728	LBL—15973(Apr 1983).
	National Bureau of Standards, Washington, DC (USA)	
	8:54878	BNL—32183
	8:54895	Water, Air, and Soil Pollution 18 173-189 (1982).
	Argonne National Lab., IL (USA)	
	8:54903	DOE/NBB—0044
	Brookhaven National Lab., Upton, NY (USA)	
	8:54966	BNL—33554
	8:54967	BNL—33561
	8:54977	
	Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)	
	8:55105	BNL—33472
	Brookhaven National Lab., Upton, NY (USA)	
	8:55106	BNL—33534
	8:55127	BNL—33659
	8:55157	BNL—33649
	Oak Ridge National Lab., TN (USA)	
	8:55160	BNL-NCS—51684
	Brookhaven National Lab., Upton, NY (USA)	
	8:55217	BNL—33493
AC02-76CH03073	Princeton Univ., NJ (USA). Plasma Physics Lab.	
	8:55245	PPPL—2020
	8:55246	PPPL—2021
	8:55253	
	8:55321	
	8:55322	
AC02-76ER00038	Univ. of Technology, Loughborough, England	
	8:54343	Journal of Physical and Chemical Reference Data 10 NO. 4. 809-999 (1981).
AC02-76ER01195	Illinois Univ., Urbana (USA). Dept. of Physics	
	8:55334	DOE/ER/01195—475
	8:55335	DOE/ER/01195—478
AC02-76ER01198	Ames Lab., IA (USA)	
	8:54253	DOE/ER/01198—1394
	8:54264	Philosophical Magazine, [Part] A: Defects and Mechanical Properties 46 NO. 4. 583-595 (198

Contract No.	Abstract No.	Report No.
	8:54286	Surface Science 120 NO. 2. L477-L482 (Aug 1982).
	8:55120	International Journal of Quantum Chemistry, Symposium 15 437-443 (1981).
AC02-76ER01338	**Michigan State Univ., East Lansing**	
	8:55067	Experimental Cell Research 140 NO. 2. 411-416 (Aug 1982).
AC02-76ER01545	**Ohio State Univ., Columbus (USA). Dept. of Physics**	
	8:55155	DOE/ER/01545—338
AC02-76ER02119	**Lawrence Berkeley Lab., CA (USA)**	
	8:54258	LBL—16031(1983).
AC02-76ER02289	**Northwestern Univ., Evanston, IL (USA). Dept. of Physics and Astronomy**	
	8:55134	CONF-830374—2
	Colorado Univ., Boulder (USA)	
	8:55137	DOE/ER/02289—T3
AC02-76ER03071	**Argonne National Lab., IL (USA)**	
	8:54648	ANL-HEP-CP—82-24(1982).
AC02-76ER03077	**Inhalation Toxicology Research Inst., Albuquerque, NM (USA)**	
	8:55012	CONF-830101—(1983).
	New York Univ., NY (USA). Magneto-Fluid Dynamics Div.	
	8:55287	DOE/ER/03077—179
AC02-76ET20279	**Massachusetts Inst. of Tech., Lexington (USA). Lincoln Lab.**	
	8:53790	DOE/ET/20279—240
AC02-76ET52040	**Illinois Univ., Urbana (USA)**	
	8:55243	DOE/ET/52040—T16
AC02-76EV00119	**Inhalation Toxicology Research Inst., Albuquerque, NM (USA)**	
	8:55015	CONF-830101—(1983).
AC02-76EV01599	**F.O.M. Inst. for Atomic and Molecular Physics, Amsterdam, The Netherlands**	
	8:54937	Aquatic Botany 15 NO. 3. 307-320 (Mar 1983).
AC02-76EV03277	**Johns Hopkins Univ., Baltimore, MD**	
	8:54342	Photochemistry and Photobiology 1-7 (1982).
AC02-76EV03490	**Univ. of Rochester, NY**	
	8:55049	Health Physics 44 NO. 6. 662-666 (Jun 1983).
AC02-76EV12529	**Columbia Univ., Palisades, NY (USA). Lamont-Doherty Geological Observatory**	
	8:54952	DOE/EV/12529—22
AC02-77CH00178	**Solar Energy Research Inst., Golden, CO (USA)**	
	8:53744	SERI/TR—231-1887
	8:53758	SERI/TP—254-2027
	8:53759	SERI/TR—215-1824
	8:53782	SERI/TP—611-1241
	8:53786	
	8:53787	
	8:53792	SERI/TR—253-1868
	8:53825	
	8:54044	
AC02-77ER04426	**Illinois Univ., Chicago (USA)**	
	8:55111	DOE/ER/04426—6
AC02-77ET10473	**Univ. of Pittsburgh, PA**	
	8:53415	DOE/PC/30089—T1(Feb 1981).
AC02-77EV04326	**New York Univ., NY**	
	8:55050	Health Physics 44 NO. 6. 668-671 (Jun 1983).
AC02-78ER04987	**Northwestern Univ., Evanston, IL (USA). Dept. of Chemical Engineering**	
	8:54306	DOE/ER/04987—4
AC02-78ER05006	**Univ. of Utah, Salt Lake City**	
	8:54327	Journal of the American Chemical Society 105 NO. 12. 3992-3998 (15 Jun 1983).
	8:54334	Journal of the American Chemical Society 105 NO. 8. 2133-2141 (20 Apr 1983).
	8:54335	Journal of the American Chemical Society 105 NO. 8. 2142-2147 (20 Apr 1983).
AC02-78ER05007	**Univ. of Utah, Salt Lake City**	
	8:53375	Preprints of Papers - American Chemical Society, Division of Fuel Chemistry 28 NO. 1. 103-
	Argonne National Lab., IL (USA)	
	8:54654	ANL-HEP-CP—82-24(1982).
AC02-78ER05016	**Brigham Young Univ., Provo, UT (USA)**	
	8:54292	DOE/ER/05016—5
AC02-78ET51013	**Massachusetts Inst. of Tech., Cambridge**	
	8:54555	International Journal of Infrared and Millimeter Waves 3 NO. 4. 427-437 (1982).
AC02-79ER10514	**Kansas State Univ., Manhattan (USA)**	
	8:55107	CONF-830390—1
AC02-79ET10815	**Tennessee Univ., Tullahoma (USA). Space Inst.**	
	8:54113	DOE/ET/10815—84
AC02-79ET15440		
	8:54122	
AC02-79ET29071	**General Electric Co., Pittsfield, MA (USA). Power Transformer Dept.**	
	8:53854	DOE/ET/29071—T5
AC02-79ET34010	**C-E Power Systems, Windsor, CT (USA)**	
	8:53874	DOE/ET/34010—9
AC02-80CS24355	**Clark Univ., Worcester, MA (USA)**	
	8:54186	DOE/CS/24355—T1
AC02-80ER10591	**Purdue Univ., Lafayette, IN (USA). School of Nuclear Engineering**	
	8:54254	DOE/ER/10591—T1
	Purdue Univ., Lafayette, IN (USA)	
	8:54255	DOE/ER/10591—T2
AC02-80ER10596	**Illinois Univ., Urbana (USA). Dept. of Chemical Engineering**	
	8:54209	DOE/ER/10596—3
AC02-80ER10762	**Applied Research Associates, Inc., South Royalton, VT (USA). New England Div.**	
	8:55080	DOE/ER/10762—T1
AC02-80ER53104	**Wisconsin Univ., Madison (USA). Dept. of Nuclear Engineering**	
	8:55241	DOE/ER/53104—6
AC02-80EV10402	**Pennsylvania Univ., Philadelphia (USA)**	
	8:54676	DOE/EV/10402—T2
AC02-81ER10830	**Yale Univ., New Haven, CT (USA). Dept. of Physics**	
	8:55112	DOE/ER/10830—2
AC02-81ER10903	**Wisconsin Univ., Madison (USA)**	
	8:54963	DOE/ER/10903—4
AC02-81ER40012	**Argonne National Lab., IL (USA)**	
	8:54647	ANL-HEP-CP—82-24(1982).
AC02-82ER12032	**Rensselaer Polytechnic Inst., Troy, NY (USA). Dept. of Physics**	
	8:54048	DOE/ER/12032—02
AC02-82ER13019	**Massachusetts Inst. of Tech., Cambridge (USA)**	
	8:53771	DOE/ER/13019—1
AC02-83CH10140	**Battelle Memorial Inst., Columbus, OH (USA). Office of Nuclear Waste Isolation**	
	8:53673	ONWI—494
AC02-83ER53147	**Illinois Univ., Urbana (USA). Nuclear Engineering Lab.**	
	8:55242	DOE/ER/53147—1
AC03-76ET12047	**Long Beach, City of, CA (USA)**	
	8:53433	DOE/ET/12047—T10
AC03-76SF00012	**Univ. of California, Los Angeles**	
	8:54348	Journal of Nuclear Medicine 24 NO. 6. 515-521 (Jun 1983).
	8:54914	Soil Science 134 NO. 1. 22-30 (Jul 1982).

Contract No.	Abstract No.	Report No.
AC03-76SF00098	**Lawrence Berkeley Lab, CA**	
	8:53358	Preprints of Papers - American Chemical Society, Division of Fuel Chemistry 28 NO. 1. 77-8
	Lawrence Berkeley Lab., CA (USA)	
	8:53371	LBL—15869
	8:53372	LBL—16448
	8:53649	LBL—16045
	8:53686	Water Resources Research 18 NO. 5. 1479-1492 (Oct 1982).
	8:54049	LBL—16514
	8:54139	LBL—13883-Rev.
	8:54219	LBL—14178
	8:54226	LBL—16031(Jun 1983).
	8:54227	LBL—16031(Jun 1983).
	8:54257	LBL—14588
	8:54308	LBL—16459
	8:54309	Inorganic Chemistry 22 NO. 15. 2137-2139 (20 Jul 1983).
	8:54311	Journal of Solid State Chemistry 48 NO. 1. 93-99 (Jun 1983).
	8:54325	Journal of the American Chemical Society 105 NO. 12. 3806-3811 (15 Jun 1983).
	8:54326	Journal of the American Chemical Society 105 NO. 12. 3929-3939 (15 Jun 1983).
	8:54477	LBL—16470
	8:54522	LBL—15751
	8:54619	LBL—15122
	8:54620	LBL—15991
	8:54621	LBL—16003
	8:54628	
	8:54629	
	Argonne National Lab., IL (USA)	
	8:54651	ANL-HEP-CP—82-24(1982).
	Lawrence Berkeley Lab., CA (USA)	
	8:54706	LBL—15973
	8:54764	LBL—15646-Rev.
	8:54765	LBL—15918-Rev.
	8:54766	LBL—16031
	8:54773	
	8:54968	LBL—15180
	8:55152	LBL—16295
	8:55194	LBL—16451
AC03-76SF00515	**Stanford Linear Accelerator Center, CA (USA)**	
	8:54593	SLAC-PUB—2946
	8:54598	CAPE—2867(1983).
	8:54599	CAPE—2868(1983).
	8:54600	CAPE—2870(1980).
	8:54601	CAPE—2872(Oct 1971).
	8:54605	DOE/SF/00515—T21
	8:54627	Particle Accelerators 13 NO. 1-2. 1-12 (1983).
	8:54635	CAPE—2869(1977).
	8:54636	CAPE—2873(Jul 1980).
	8:54668	CAPE—2871(1983).
	8:55141	SLAC-PUB—3099
	8:55142	SLAC-PUB—3187
	8:55156	Nuovo Cimento [Sezione] A 74 NO. 4. 413-426 (21 Apr 1983).
	8:55306	SLAC-PUB—3113
AC03-78SF02034	**Gas-Cooled Reactor Associates, San Diego, CA (USA)**	
	8:53910	GCRA—83-009
AC04-76DP00053	**USDOE Technical Information Center, Oak Ridge, TN**	
	8:53615	CONF-821005—(1982).
	8:53622	CONF-821005—(1982).
	Monsanto Research Corp., Miamisburg, OH (USA). Mound	
	8:53650	MLM—3074(OP)
	8:53651	MLM—3094(OP)
	8:54236	MLM—3089
	8:55231	
	8:55232	
AC04-76DP00789	**Utah Univ., Salt Lake City (USA). Dept. of Fuels Engineering**	
	8:53350	SAND—83-7110
	8:53360	Preprints of Papers - American Chemical Society, Division of Fuel Chemistry 28 NO. 1. 148-
	Sandia National Labs., Albuquerque, NM (USA)	
	8:53434	SAND—83-0518
	8:53436	
	Oak Ridge National Lab., TN (USA)	
	8:53487	CONF-830528—Summ.(1983).
	8:53488	CONF-830528—Summ.(1983).
	8:53499	CONF-830528—Summ.(1983).
	8:53509	CONF-830528—Summ.(1983).
	8:53514	CONF-830528—Summ.(1983).
	8:53523	CONF-830528—Summ.(1983).
	8:53524	CONF-830528—Summ.(1983).
	8:53525	CONF-830528—Summ.(1983).
	8:53534	CONF-830528—Summ.(1983).
	8:53540	CONF-830528—Summ.(1983).
	8:53544	CONF-830528—Summ.(1983).
	8:53546	CONF-830528—Summ.(1983).
	8:53552	CONF-830528—Summ.(1983).
	8:53556	CONF-830528—Summ.(1983).
	8:53567	CONF-830528—Summ.(1983).
	8:53571	CONF-830528—Summ.(1983).
	8:53576	CONF-830528—Summ.(1983).
	8:53577	CONF-830528—Summ.(1983).
	8:53578	CONF-830528—Summ.(1983).
	Sandia National Labs., Albuquerque, NM (USA)	
	8:53582	SAND—82-2778
	Oak Ridge National Lab., TN (USA)	
	8:53705	CONF-830528—Summ.(1983).
	8:53706	CONF-830528—Summ.(1983).
	Hanford Engineering Development Lab., Richland, WA (USA)	
	8:53713	SAND—82-1998C
	Sandia National Labs., Albuquerque, NM (USA)	
	8:53718	NUREG/CR—1246-Vol.4
	8:53723	
	8:53761	SAND—83-1283
	Drilling Research Lab., Inc., Salt Lake City, UT (USA)	
	8:53836	SAND—83-7102
	Texas Tech Univ., Lubbock (USA). Dept. of Mechanical Engineering	
	8:53852	SAND—83-7029
	Sandia National Labs., Albuquerque, NM (USA)	
	8:54027	NUREG/CR—2238-Vol.20
	8:54028	NUREG/CR—2631
	8:54030	NUREG/CR—3234
	8:54031	NUREG/CR—3269
	8:54036	SAND—83-0795C
	Battelle Columbus Labs., OH (USA)	
	8:54050	SAND—83-7122
	Sandia National Labs., Albuquerque, NM (USA)	
	8:54239	SAND—83-1273C
	8:54242	Metallography 16 NO. 1. 99-106 (Feb 1983).
	8:54281	SAND—83-0194C
	8:54285	
	Oak Ridge National Lab., TN (USA)	
	8:54379	CONF-830528—Summ.(1983).
	8:54384	CONF-830528—Summ.(1983).
	8:54391	CONF-830528—Summ.(1983).
	8:54400	CONF-830528—Summ.(1983).
	8:54401	CONF-830528—Summ.(1983).
	8:54403	CONF-830528—Summ.(1983).
	8:54405	CONF-830528—Summ.(1983).
	8:54409	CONF-830528—Summ.(1983).
	8:54410	CONF-830528—Summ.(1983).
	8:54413	CONF-830528—Summ.(1983).
	8:54414	CONF-830528—Summ.(1983).
	8:54421	CONF-830528—Summ.(1983).
	8:54422	CONF-830528—Summ.(1983).
	8:54424	CONF-830528—Summ.(1983).
	8:54426	CONF-830528—Summ.(1983).
	8:54427	CONF-830528—Summ.(1983).
	8:54439	CONF-830528—Summ.(1983).

Contract No.	Abstract No.	Report No.
	8:54443	CONF-830528—Summ.(1983).
	8:54444	CONF-830528—Summ.(1983).
	8:54449	CONF-830528—Summ.(1983).
	8:54451	CONF-830528—Summ.(1983).
	8:54456	CONF-830528—Summ.(1983).
	8:54480	
	8:54514	IEEE (Institute of Electrical and Electronics Engineers) Journal of Quantum Electronics 1
	Sandia National Labs., Albuquerque, NM (USA)	
	8:54524	SAND—83-1844C
	8:54552	SAND—83-0665C
	8:54566	SAND—83-0524C
	New Mexico State Univ., Las Cruces (USA)	
	8:54768	SAND—83-0263
	Naval Ocean Research and Development Activity, NSTL, MS (USA)	
	8:54769	SAND—83-0959C
	Sandia National Labs., Livermore, CA (USA)	
	8:54770	SAND—83-8025
	8:54779	
	8:54782	
	8:54783	
	8:54852	CONF-810602—(1981).
	8:54862	CONF-810602—(1981).
	Inhalation Toxicology Research Inst., Albuquerque, NM (USA)	
	8:55003	CONF-830101—
	Sandia National Labs., Albuquerque, NM (USA)	
	8:55081	SAND—83-1148C
	8:55119	
	8:55228	SAND—83-1902C
	8:55296	SAND—83-0564C
	8:55297	SAND—83-0575C
	8:55298	SAND—83-0609C
	8:55299	SAND—83-0611C
	8:55300	SAND—83-0612C
	8:55301	SAND—83-0617C
	8:55302	SAND—83-0620C
	8:55303	SAND—83-0950C
	8:55304	SAND—83-1316C
	8:55305	SAND—83-1992C
	8:55339	SAND—83-1265
	8:55340	SAND—83-1945C
	Sandia National Labs., Livermore, CA (USA)	
	8:55341	SAND—83-8029
AC04-76EV01013	**Lovelace Biomedical and Environmental Research Inst., Albuquerque, NM**	
	8:55054	Health Physics 44 NO. 2. 135-143 (Feb 1983).
	8:55058	Health Physics 45 NO. 1. 39-60 (1983).
AC04-78AL05346	**Evaluation Research Corp., Oak Ridge, TN (USA)**	
	8:55046	WIPP-DOE—176
AC04-78AL10752	**New Mexico Health and Environment Dept., Santa Fe (USA). Environmental Improvement Div.**	
	8:53580	DOE/AL/10752—24
AC04-78CS54045	**Suntech, Inc., Marcus Hook, PA (USA). Applied Research Dept.**	
	8:53742	DOE/CS/54045—1-Vol.1-Summ.
AC05-76OR00033	**Inhalation Toxicology Research Inst., Albuquerque, NM (USA)**	
	8:55008	CONF-830101—(1983).
	8:55009	CONF-830101—(1983).
	8:55018	CONF-830101—(1983).
	8:55020	CONF-830101—(1983).
	8:55022	CONF-830101—(1983).
	8:55029	CONF-830101—(1983).
	8:55032	CONF-830101—(1983).
	8:55038	CONF-830101—(1983).
	8:55047	Journal of Nuclear Medicine 24 NO. 7. 637-640 (Jul 1983).
AC05-76OR01156		
	8:53472	

Contract No.	Abstract No.	Report No.
AC05-78ET53043	**Texas Univ., Austin (USA). Fusion Research Center**	
	8:55244	DOE/ET/53043—6
AC05-80CS40341	**Saint Regis Paper Co., Pensacola, FL (USA). Technical Operations Div.**	
	8:54160	DOE/CS/40341—T2
	8:54161	DOE/CS/40341—T3
AC06-76FF02170	**Hanford Engineering Development Lab., Richland, WA (USA)**	
	8:53897	HEDL-TME—83-11
	8:53929	HEDL—7387
	Oak Ridge National Lab., TN (USA)	
	8:54420	CONF-830528—Summ.(1983).
AC06-76RL01830	**Pacific Northwest Lab., Richland, WA (USA)**	
	8:53428	PNL-SA—11371
	Oak Ridge National Lab., TN (USA)	
	8:53530	CONF-830528—Summ.(1983).
	8:53555	CONF-830528—Summ.(1983).
	8:53563	CONF-830528—Summ.(1983).
	8:53641	CONF-830528—Summ.(1983).
	Battelle Pacific Northwest Labs., Richland, WA (USA)	
	8:53643	DOE/EP—0100
	Woodward-Clyde Associates, San Francisco, CA (USA)	
	8:53658	ONWI—92
	Minnesota Univ., Minneapolis (USA)	
	8:53659	ONWI—195
	RE/SPEC, Inc., Rapid City, SD (USA)	
	8:53660	ONWI—197
	Engineering Decision Analysis Co., Inc., Palo Alto, CA (USA)	
	8:53661	ONWI—284
	Stone and Webster Engineering Corp., New York (USA)	
	8:53662	ONWI—363
	Law Engineering Testing Co., Atlanta, GA (USA)	
	8:53663	ONWI—365
	Louisiana State Univ., Baton Rouge (USA). Inst. for Environmental Studies	
	8:53664	ONWI—417
	Battelle Columbus Labs., OH (USA)	
	8:53670	ONWI—474
	ERTEC, Inc., Long Beach, CA (USA)	
	8:53671	ONWI—478
	D'Appolonia Consulting Engineers, Inc., Pittsburgh, PA (USA)	
	8:53672	ONWI—486
	Pacific Northwest Lab., Richland, WA (USA)	
	8:53675	PNL—4333
	8:53676	PNL—4738
	8:53677	PNL—4844
	8:53678	PNL-SA—11568
	8:53679	PNL-SA—11579
	NUS Corp., Rockville, MD (USA)	
	8:53689	ONWI—27
	Oak Ridge National Lab., TN (USA)	
	8:53695	CONF-830528—Summ.(1983).
	Pacific Northwest Lab., Richland, WA (USA)	
	8:53731	PNL—4759
	8:53851	PNL—4663
	Oak Ridge National Lab., TN (USA)	
	8:53868	CONF-830528—Summ.(1983).
	Pacific Northwest Lab., Richland, WA (USA)	
	8:53869	CONF-830649—3
	8:53952	NUREG/CR—2850-Vol.2
	USDOE Technical Information Center, Oak Ridge, TN	
	8:54013	CONF-821005—(1982).
	Pacific Northwest Lab., Richland, WA (USA)	
	8:54035	PNL-SA—10781
	8:54062	PNL—4581

Contract No.	Abstract No.	Report No.
	Energyworks, Inc., West Newton, MA (USA)	
	8:54143	PNL—4763
	Pacific Northwest Lab., Richland, WA (USA)	
	8:54144	PNL-SA—11502
	8:54145	PNL-SA—11509
	8:54174	PNL—4803
	8:54175	PNL-SA—11354
	Lawrence Berkeley Lab., CA (USA)	
	8:54235	LBL—16031(1983).
	8:54249	Journal of Materials Science 17 1142-1148 (1982).
	Pacific Northwest Lab., Richland, WA (USA)	
	8:54523	PNL-SA—9530-Pt.2
	8:54892	Water, Air, and Soil Pollution 18 45-64 (1982).
	8:54894	Water, Air, and Soil Pollution 18 123-128 (1982).
	8:54911	PNL-SA—10870
	8:54926	NUREG/CR—3404
	8:54949	Bulletin of Environmental Contamination and Toxicology 28 NO. 5. 566-572 (May 1982).
	8:54982	PNL-SA—11282
	8:55227	PNL-SA—11167
	8:55327	PNL-SA—10382
AC06-76RL01857	**United Nuclear Industries, Inc., Richland, WA (USA)**	
	8:53984	UNI—436
	USDOE Technical Information Center, Oak Ridge, TN	
	8:53988	CONF-821005—
AC06-77RL01030	**Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations**	
	8:53474	RHO-PB-SR—10-B-SUM-JUN-83
	8:53680	RHO-BW-ST—19-P
	8:53681	RHO-PB-SR—10-B-WM-JUN-83
	8:53688	
AC07-76ID01570	**EG and G Idaho, Inc., Idaho Falls (USA)**	
	8:54034	NUREG/CR—3419
	8:55191	International Journal of Applied Radiation and Isotopes 33 355-358 (1982).
AC07-79ID01675	**Exxon Nuclear Idaho Co., Inc., Idaho Falls (USA)**	
	8:53646	ENICO—1116-8-83
	8:53647	ENICO—1134
	8:53648	ENICO—1136
	8:53932	
AC08-76NV00410	**Oak Ridge National Lab., TN (USA)**	
	8:53707	CONF-830528—Summ.(1983).
	8:53709	CONF-830528—Summ.(1983).
AC08-76NV01183	**Oak Ridge National Lab., TN (USA)**	
	8:53872	CONF-830528—Summ.(1983).
AC09-76SR00001	**USDOE Technical Information Center, Oak Ridge, TN**	
	8:53631	CONF-821005—(1982).
	8:53853	
	Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.	
	8:54210	DP-MS—82-55
	Oak Ridge National Lab., TN (USA)	
	8:54435	CONF-830528—Summ.(1983).
	8:54929	Health Physics 44 NO. 1. 19-28 (Jan 1983).
	Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.	
	8:55070	DP-MS—82-85
AC09-76SR00819	**Savannah River Ecology Lab., Aiken, SC**	
	8:54931	Journal of Environmental Quality 11 NO. 3. 506-511 (Jul 1982).
AC11-76PN00014		
	8:53904	
AC11-76PN00292	**Duquesne Light Co., Pittsburgh, PA (USA)**	
	8:53873	DLCS—5000283
AC12-76SN00052		
	8:54544	
AC13-76GJ01664	**Bendix Field Engineering Corp., Grand Junction, CO (USA)**	
	8:53464	GJBX—37(83)-Vol.1
	8:53465	GJBX—37(83)-Vol.2
	Bendix Field Engineering Corp., Grand Junction, CO (USA). Grand Junction Operations	
	8:54781	GJBX—28(83)
AC18-81FC10492	**Tennessee Univ., Knoxville (USA). Dept. of Civil Engineering**	
	8:53386	DOE/FC/10492—T1
AC19-80BC10308	**Argonne National Lab., IL (USA)**	
	8:53431	DOE/BC/10308—30
AC19-80BC10309	**Geochem Research, Inc., Houston, TX (USA)**	
	8:53432	DOE/BC/10309—16
AC21-79MC11251	**Maurer Engineering, Inc., Houston, TX (USA)**	
	8:53430	DOE/MC/11251—1442
AC21-80ET17091	**General Electric Co., Schenectndy, NY (USA). Advanced Energy Programs Dept.**	
	8:54557	DOE/ET/17091—1355
	8:54558	DOE/ET/17091—1356
AC21-80ET17093	**Westinghouse Electric Corp., Pittsburgh, PA (USA)**	
	8:53385	DOE/ET/17093—1471
AC21-80MC14129	**National Coal Board, Leatherhead (UK). Coal Utilization Research Lab.**	
	8:54560	DOE/MC/14129—1463
AC21-80MC14593	**SRI International, Menlo Park, CA**	
	8:53587	Preprints of Papers - American Chemical Society, Division of Fuel Chemistry 28 NO. 1. 62-7
AC21-81MC16310	**Department of Chemical Engineering, Kansas State University, Manhattan, KS 66506**	
	8:54526	AIChE (American Institute of Chemical Engineers) Journal 29 NO. 1. 33-39 (Jan 1983).
	8:54527	AIChE (American Institute of Chemical Engineers) Journal 29 NO. 1. 101-106 (Jan 1983).
AC21-82MC19077	**Pacific Northwest Lab., Richland, WA (USA)**	
	8:54115	DOE/MC/19077—T3
AC21-82MC19210	**General Electric Co., Schenectady, NY (USA). Corporate Research and Development Center**	
	8:53367	DOE/MC/19210—1453
AC21-82MC19314	**Mississippi State Univ., Mississippi State (USA). MHD Energy Center**	
	8:53368	DOE/MC/19314—1474
AC22-79ET14880	**Delaware Univ., Newark (USA). Dept. of Chemical Engineering**	
	8:53366	DOE/ET/14880—T4
AC22-80ET14146	**Southern Illinois Univ., Carbondale (USA)**	
	8:53400	DOE/ET/14146—T1
AC22-80ET15614	**Avco-Everett Research Lab., Everett, MA (USA)**	
	8:54114	DOE/ET/15614—T4
AC22-80PC30013	**Pennsylvania State Univ., University Park (USA). Coal Research Section**	
	8:53399	DOE/PC/30013—10
AC22-80PC30088	**Univ. of Chicago, IL**	
	8:53379	Preprints of Papers - American Chemical Society, Division of Fuel Chemistry 28 NO. 1. 137-
AC22-80PC30089	**Pittsburgh Univ., PA (USA). Dept. of Chemical and Petroleum Engineering**	
	8:53414	DOE/PC/30089—T1

Contract No.	Abstract No.	Report No.
AC22-81PC40784	Pennsylvania State Univ., University Park (USA). Coal Research Section	
	8:53342	DOE/PC/40784—T2
AC79-80BP22849	Washington Univ., Seattle (USA)	
	8:53846	DOE/BP—137
AI01-76ET20320	National Aeronautics and Space Administration, Cleveland, OH (USA). Lewis Research Center	
	8:53847	DOE/NASA/20320—48
	8:53848	DOE/NASA/20320—50
AI01-77ET10769	Texas Univ., Arlington (USA). Dept. of Aerospace Engineering	
	8:54116	DOE/NASA/3255—1(7-81)
AI08-79DP40092	Naval Research Lab., Washington, DC (USA)	
	8:55294	NRL-MR—5184
AP07-80ID12140	American Solarhol Corp., Baltimore, MD	
	8:53743	DOE/ID/12140—T1
AS01-77ET29196	Rensselaer Polytechnic Inst., Troy, NY (USA)	
	8:55221	DOE/ET/29196—T1
	8:55222	DOE/ET/29196—T2
AS01-78ET29135	Univ. of California, Berkeley	
	8:53866	IEEE (Institute of Electrical and Electronics Engineers) Transactions on Automatic Control
AS05-76ER03065	Duke Univ., Durham, NC (USA)	
	8:55138	DOE/ER/03065—T3
AS05-76EV03861	Tennessee Univ., Knoxville (USA). Dept. of Physics and Astronomy	
	8:55114	DOE/EV/03861—48
AS05-77ER05489	Georgia Inst. of Tech., Atlanta (USA). School of Physics	
	8:54307	DOE/ER/05489—2
AS05-82ER60100	Emory Univ., Atlanta, GA (USA). Dept. of Chemistry	
	8:54880	DOE/ER/60100—T1
AS07-76ID01606	Idaho State Univ., Pocatello (USA). Dept. of Biology	
	8:53839	DOE/ID/01606—T1
AS07-78ID01740	Wyoming Univ., Laramie (USA)	
	8:53394	DOE/ID/01740—T1
AS08-82DP40173	Illinois Univ., Urbana (USA). Fusion Studies Lab.	
	8:54509	DOE/DP/40173—T1
AS09-77ER01023	Georgia Univ., Athens (USA). Dept. of Physics	
	8:53730	DOE/ER/01023—6
AS09-80ER10671	Clemson Univ., SC	
	8:54340	Journal of the American Chemical Society 105 NO. 8. 2274-2279 (20 Apr 1983).
AS20-81LC10652	Colorado State Univ., Fort Collins	
	8:54324	Journal of the American Chemical Society 105 NO. 12. 3767-3776 (15 Jun 1983).
AS20-81LC10678	Arizona Univ., Tucson (USA)	
	8:53462	DOE/LC/10678—T1
AT03-76ER70030	Rockwell International Corp., Canoga Park, CA	
	8:54337	Inorganic Chemistry 22 NO. 15. 2168-2177 (20 Jul 1983).
AT03-76ER70185	California Univ., Santa Cruz (USA). Dept. of Biology	
	8:54981	DOE/ER/70185—T1
AT03-76ET28364	Stanford Univ., CA (USA). Stanford Geothermal Program	
	8:53837	SGP-TR—40
AT03-76ET51011	GA Technologies, Inc., San Diego, CA (USA)	
	8:55289	GA-A—17012
	8:55290	GA-A—17016
	8:55291	GA-A—17018
	8:55292	GA-A—17157
AT03-76SF71032		
	8:53950	
	8:54556	
AT03-80ER10573	Stanford Univ., CA (USA)	
	8:54519	CONF-8006216—
AT03-80ER10684	California Univ., Los Angeles (USA). School of Public Health	
	8:54979	DOE/ER/10684—T1
AT03-80ER10688	Stanford Univ., CA (USA)	
	8:54675	DOE/ER/10688—T1
AT03-80SF10842	SRI International, Menlo Park, CA (USA)	
	8:54163	DOE/SF/10842—T1
	8:54164	DOE/SF/10842—T2
AT06-76ER70038	Oregon State Univ., Corvallis (USA). Dept. of Physics	
	8:55113	DOE/ER/70038—5
AT06-76EV70009	Alaska Univ., Fairbanks (USA). Inst. of Marine Science	
	8:54933	DOE/EV/70009—T2
	8:54941	DOE/EV/70009—T1
AT06-76RL74032	Oregon State Univ., Corvallis (USA). Dept. of Nuclear Engineering	
	8:53912	DOE/RL/74032—7
	8:53913	DOE/RL/74032—8
AT21-79MC12233	West Virginia Univ., Morgantown (USA)	
	8:54559	DOE/MC/12233—T1
AT21-80MC14731	West Virginia Univ., Morgantown (USA). Dept. of Chemical Engineering	
	8:53337	DOE/MC/14731—1439
FC01-79ER10000	Texas Instruments, Inc., Dallas (USA). Central Research Lab.	
	8:53770	DOE/ER/10000—T1
FC03-80RA50239	Pickard-Lowe and Garrick, Inc., Irvine, CA (USA)	
	8:53834	DOE/RA/50239—T3-Rev.1
FC04-80CS30264	Acurex Corp., Mountain View, CA (USA)	
	8:53819	DOE/CS/30264—T1
FC07-80ID12147	Stanford Univ., CA (USA). Dept. of Geophysics	
	8:53841	DOE/ID/12147—T1-Rev.
FG01-78ET20587	Michigan Technological Univ., Houghton (USA). Dept. of Forestry	
	8:53772	DOE/ET/20587—T1
FG01-78ET23074	Illinois Univ., Urbana (USA). Dept. of Forestry	
	8:53773	DOE/ET/23074—T2
FG01-79CS30013	Alabama Univ., Huntsville (USA). Kenneth E. Johnson Environmental and Energy Center	
	8:54105	UAH—345
FG01-80CS15024	Advanced Solar Components, Inc., Brockton, MA (USA)	
	8:53818	DOE/CS/15024—T1
FG01-80IR10430	Los Angeles, City of, CA (USA)	
	8:54193	DOE/IR/10430—T1
FG01-80RA50146	Northern Indiana Public Service Co., Hammond (USA)	
	8:55288	DOE/RA/50146—T1
FG01-81CA10015	Sangamon State Univ., Springfield, IL (USA)	
	8:54192	DOE/CA/10015—T1
FG01-82CE15094	Energotechnology Corp., Cambridge, MA (USA)	
	8:53858	DOE/CE/15094—T1
FG01-82CE15126	Lantz America, New York	
	8:54182	DOE/CE/15126—T2
	8:54183	DOE/CE/15126—T3
FG01-83CE64832	American Hospital Association, Chicago, IL	
	8:54136	DOE/CE/64832—T1
FG02-80ER10178	Ohio State Univ., Columbus (USA)	
	8:54088	DOE/ER/10178—2
FG02-81R510307	Michigan State Univ., East Lansing (USA). Dept. of Agricultural Engineering	
	8:53746	DOE/R5/10307—1
FG03-78CS50277	Stanford Univ., CA (USA)	
	8:54054	DOE/CS/50277—T2
FG07-82ID12371	Colorado Office of the Governor, Denver (USA)	
	8:53644	DOE/ID/12371—4

Contract No.	Abstract No.	Report No.
FG21-78ET12229	**Department of Chemical Engineering, Illinois Institute of Technology, Chicago, Illinois 60616**	
	8:54364	Industrial and Engineering Chemistry Fundamentals 22 NO. 2. 193-202 (May 1983).
FG22-80PC30209	**Auburn Univ., AL (USA)**	
	8:53338	DOE/PC/30209—T1
	8:53339	DOE/PC/30209—T2
	8:53340	DOE/PC/30209—T3
	Auburn Univ., AL (USA). Coal Conversion Lab.	
	8:53341	DOE/PC/30209—T4
FG22-80PC30211	**Brown Univ., Providence, RI**	
	8:53355	Preprints of Papers - American Chemical Society, Division of Fuel Chemistry 28 NO. 1. 6-16
FG22-80PC30222	**Purdue Univ., Lafayette, IN (USA). School of Chemical Engineering**	
	8:53369	DOE/PC/30222—T3
FG22-80PC30242	**Univ. of Utah, Salt Lake City**	
	8:53359	Preprints of Papers - American Chemical Society, Division of Fuel Chemistry 28 NO. 1. 97-1
FG22-81PC40771	**Department of Chemical Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts**	
	8:54316	Industrial and Engineering Chemistry Fundamentals 22 NO. 2. 258-263 (May 1983).
FG22-81PC40789	**Purdue Univ., Lafayette, IN (USA). School of Mechanical Engineering**	
	8:53370	DOE/PC/40789—T7
FG22-82PC50784	**Auburn Univ., AL (USA). Coal Conversion Lab.**	
	8:53343	DOE/PC/50784—T1
FG22-82PC50786	**Iowa State Univ. of Science and Technology, Ames (USA). Energy and Mineral Resources Research Inst.**	
	8:53344	DOE/PC/50786—T1
FG22-82PC50793	**Auburn Univ., AL (USA). Coal Conversion Lab.**	
	8:53345	DOE/PC/50793—T3
FG97-80ET46630	**Army Engineer Waterways Experiment Station, Vicksburg, MS (USA). Structures Lab.**	
	8:53645	DOE/NBM—3018226
FM01-82FE55014	**Great Plains Gasification Associates, Detroit, MI (USA)**	
	8:53336	DOE/FE/55014—T5
NAS-7-100-954929	**Clemson Univ., SC (USA). Dept. of Electrical and Computer Engineering**	
	8:53775	DOE/JPL/954929—83/10
NAS-7-100-956133	**Oregon State Univ., Corvallis (USA)**	
	8:53776	DOE/JPL/956133—83-1
NAS-7-100-956254	**General Electric Co., Philadelphia, PA (USA). Advanced Energy Programs Dept.**	
	8:53777	DOE/JPL/956254—1
W-31-109-ENG-38	**Argonne National Lab., IL**	
	8:53374	Preprints of Papers - American Chemical Society, Division of Fuel Chemistry 28 NO. 1. 93-9
	8:53378	Preprints of Papers - American Chemical Society, Division of Fuel Chemistry 28 NO. 1. 131-
	Argonne National Lab., IL (USA)	
	8:53411	ANL/EES-TM—232
	8:53439	CONF-830847—1
	USDOE Technical Information Center, Oak Ridge, TN	
	8:53612	CONF-821005—(1982).
	8:53735	Journal of Physical Chemistry 87 NO. 3. 394-399 (3 Feb 1983).

Contract No.	Abstract No.	Report No.
	Argonne National Lab., IL (USA)	
	8:53794	CONF-830851—1
	8:53815	CONF-830874—26
	8:53827	
	Bechtel Group, Inc., San Francisco, CA (USA)	
	8:53856	ANL/FE—83-13
	8:53857	ANL/FE—83-14
	Argonne National Lab., IL (USA)	
	8:53859	DOE/RG—0063
	8:53905	
	8:53934	
	8:53955	CONF-801144—5
	8:53956	CONF-801144—6
	8:53957	CONF-801144—7
	8:53958	CONF-801144—8
	8:53959	CONF-801144—9
	8:53960	CONF-801144—10
	8:53961	CONF-801144—11
	8:53962	CONF-821155—11
	8:53963	CONF-821155—12
	8:53964	CONF-821155—13
	8:54017	CONF-821155—9
	8:54019	CONF-830816—35
	8:54020	CONF-831047—86
	8:54022	DOE/NBM—3017872
	8:54033	NUREG/CR—3359-Vol.2
	8:54046	CONF-831020—2
	8:54047	CONF-831020—3
	8:54051	
	8:54057	CONF-8308113—3
	8:54074	CONF-830731—1
	8:54117	CONF-831104—1
	8:54120	CONF-8308120—1
	Purdue Univ., Indianapolis, IN (USA)	
	8:54159	ANL/CNSV—41
	8:54190	
	8:54244	
	8:54250	Philosophical Magazine, [Part] A: Defects and Mechanical Properties 46 NO. 4. 575-582 (198
	8:54305	Magnetic Resonance Review 7 NO. 2. 147-174 (1982).
	8:54318	Science (Washington, D.C.) 220 197-199 (8 Apr 1983).
	8:54365	Journal of Physical Chemistry 87 NO. 3. 441-446 (3 Feb 1983).
	Argonne National Lab., IL (USA)	
	8:54471	CONF-830841—14
	8:54472	CONF-830841—15
	8:54545	
	8:54567	
	8:54574	ANL-HEP-CP—83-47
	8:54603	CONF-830384—2
	8:54673	CONF-8310157—1
	8:54750	
	8:54772	
	8:54879	CONF-831063—4
	8:54972	CONF-8306122—1
	Inhalation Toxicology Research Inst., Albuquerque, NM (USA)	
	8:55026	CONF-830101—(1983).
	8:55059	Health Physics 45 NO. 1. 9-20 (1983).
	Argonne National Lab., IL (USA)	
	8:55108	CONF-830936—2
	8:55123	ANL-HEP-CP—82-24
	8:55135	CONF-830798—1
	8:55145	CONF-830588—4
	8:55262	CONF-830538—18
	8:55281	CONF-830795—3
	8:55282	CONF-830841—13
	Argonne National Lab., Idaho Falls, ID (USA)	
	8:55283	CONF-830942—5
	Argonne National Lab., IL (USA)	
	8:55332	CONF-830577—4
	8:55333	CONF-830899—3
W-7405-ENG-26	**Oak Ridge National Lab., TN (USA)**	
	8:53348	ORNL/TM—8227

Contract No.	Abstract No.	Report No.
	8:53364	Microstructural Science 10 183-193 (1982).
	8:53373	Preprints of Papers - American Chemical Society, Division of Fuel Chemistry 28 NO. 1. 44-4
	8:53382	
	8:53424	CONF-8308109—1
	8:53470	CONF-830528—Summ.(1983).
	8:53473	CONF-8308111—1
	8:53476	AIChE (American Institute of Chemical Engineers) Journal 29 NO. 1. 26-32 (Jan 1983).
	8:53477	CONF-830528—Summ.
	8:53501	CONF-830528—Summ.(1983).
	8:53502	CONF-830528—Summ.(1983).
	8:53519	CONF-830528—Summ.(1983).
	8:53528	CONF-830528—Summ.(1983).
	8:53541	CONF-830528—Summ.(1983).
	8:53547	CONF-830528—Summ.(1983).
	8:53548	CONF-830528—Summ.(1983).
	8:53579	CONF-830528—Summ.(1983).
	8:53581	ORNL/TM—8419
	8:53642	CONF-8308106—4
	8:53654	NUREG/CR—3204
	8:53655	NUREG/CR—3397
	8:53674	ORNL/TM—8717
	8:53687	
	8:53720	NUREG/CR—0200-Vols.1-2-3-Bk.5
	8:53721	NUREG/CR—0200-Vols.1-2-3-Bk.4
	8:53741	CONF-8308107—1
	Heliouetics, Inc., San Diego, CA (USA). Laser Div.	
	8:53764	CONF-830109—3
	8:53862	Environmental Management 6 NO. 5. 431-439 (Sep 1982).
	Oak Ridge National Lab., TN (USA)	
	8:54021	DOE/NBM—3012066
	8:54029	NUREG/CR—3179
	8:54059	DOE/NBM—3012064
	8:54138	DOE/NBM—3018111
	Oak Ridge Y-12 Plant, TN (USA)	
	8:54204	Y/DU—301
	8:54233	LBL—16031(1983).
	8:54245	Welding Research (Miami) 302s-311s (Sep 1982).
	8:54247	High Temperature Science 15 187-198 (1982).
	8:54261	American Ceramic Society Bulletin 61 NO. 9. 974-981 (Sep 1982).
	8:54265	Journal of Crystal Growth 58 647-649 (1982).
	8:54283	Electr a Device Letters EDL-3 NO. 10. 280-283 (Oct 1982).
	8:54287	American Mineralogist 67 349 (Mar-Apr 1982).
	8:54289	Journal of Crystal Growth 59 583-598 (1982).
	8:54303	Y/DK—357
	8:54314	Inorganic Chemistry 22 NO. 11. 1651-1655 (25 May 1983).
	8:54350	Inorganic Chemistry 22 NO. 10. 1494-1503 (11 May 1983).
	8:54369	
	Oak Ridge National Lab., TN (USA)	
	8:54402	CONF-830528—Summ.(1983).
	8:54406	CONF-830528—Summ.(1983).
	8:54432	CONF-830528—Summ.(1983).
	8:54445	CONF-830528—Summ.(1983).
	8:54461	CONF-830528—Summ.(1983).
	8:54530	
	8:54543	
	8:54550	CONF-8308112—1
	8:54747	Health Physics 44 NO. 6. 684-688 (Jun 1983).
	8:54767	LBL—16031(1983).
	8:54774	
	Union Carbide Corp., Oak Ridge, TN (USA). Nuclear Div.	
	8:54881	DOE/NBB—0040
	8:54899	Health Physics 44 NO. 6. 653-655 (Jun 1983).
	8:54900	Health Physics 45 NO. 1. 81-88 (1983).
	Oak Ridge National Lab., TN (USA)	
	8:54909	CONF-8308115—1
	8:54913	Soil Science Society of America Journal 46 NO. 5. 1114-1116 (Sep 1982).
	Union Carbide Corp., Oak Ridge, TN (USA). Nuclear Div.	
	8:54962	CONF-8308110—1
	Tennessee Univ., Oak Ridge (USA). Graduate School of Biomedical Sciences	
	8:55039	DOE/NBM—3015766
	8:55048	Health Physics 44 NO. 6. 595-600 (Jun 1983).
	8:55051	Journal of Virology 46 NO. 1. 288-292 (Apr 1983).
	Oak Ridge National Lab., TN (USA)	
	8:55069	CONF-8208157—1
	8:55109	CONF-8308108—1
	8:55110	CONF-8308112—2
	Oak Ridge Y-12 Plant, TN (USA)	
	8:55215	Y/DD—317
	Union Carbide Corp., Oak Ridge, TN (USA). Nuclear Div.	
	8:55236	CONF-820180—1
	Oak Ridge National Lab., TN (USA)	
	8:55237	CONF-830406—104
	8:55239	CONF-8206219—1-Draft
	8:55240	CONF-8305127—1
	8:55260	CONF-810214—15-DRAFT
	Tennessee Univ., Knoxville (USA)	
	8:55261	CONF-830389—1
	Oak Ridge National Lab., TN (USA)	
	8:55284	CONF-8106311—2-Draft
	8:55285	CONF-8204141—1
	8:55286	CONF-8305128—1
	National Library of Medicine, Washington, DC (USA)	
	8:55330	CONF-810188—1-Draft
	Oak Ridge National Lab., TN (USA)	
	8:55331	CONF-830492—1
W-7405-ENG-36		
	8:53722	
	8:53725	
	8:54243	
	8:54304	
	Los Alamos National Lab., NM (USA)	
	8:54475	LA-UR—83-2351
	8:54481	
	8:54510	LA-UR—83-2411
	8:54511	LA-UR—83-2443
	8:54529	LA-tr—83-14(1983).
	8:54538	LA-UR—83-2399
	8:54539	LA-UR—83-2400
	8:54763	LA-UR—83-2291
	Naval Surface Weapons Center, Dahlgren, VA (USA)	
	8:54785	CONF-810602—
	8:54889	
	8:54918	
	Inhalation Toxicology Research Inst., Albuquerque, NM (USA)	
	8:55027	CONF-830101—(1983).
	Los Alamos National Lab., NM (USA)	
	8:55094	LA-UR—83-2368
	8:55095	LA-UR—83-2486
	8:55116	LA-UR—83-2319
	Lund Univ. (Sweden)	
	8:55189	LA-UR—83-2355
	Los Alamos National Lab., NM (USA)	
	8:55338	LA—9770-MS
W-7405-ENG-48	**Missouri Univ., Columbia (USA). Dept. of Chemistry**	
	8:53351	UCRL—15548

Contract No.	Abstract No.	Report No.
	Lawrence Livermore National Lab., CA (USA)	
	8:53393	UCRL—53336
	8:53726	
	8:53727	UCRL—89511
	8:53826	
	8:53828	
	8:53909	UCID—19720
	8:54032	NUREG/CR—3345
	8:54037	UCRL—53287
	8:54052	
	8:54123	
	8:54240	UCID—19890
	8:54341	Chemical Physics Letters 91 NO. 5. 335-338 (24 Sep 1982).
	8:54478	UCRL—89738
	8:54479	UCRL—89756
	8:54482	
	8:54483	
	8:54485	
	8:54486	
	8:54515	
	8:54516	
	8:54525	UCID—19887
	8:54553	UCID—19877-Pt.1
	8:54554	UCRL—88671
	Lawrence Berkeley Lab., CA (USA)	
	8:54594	UCRL—89227
	Lawrence Livermore National Lab., CA (USA)	
	8:54604	CONF-830911—Absts.
	8:54753	
	8:54771	UCRL—89776
	8:54775	
	8:54776	
	8:54777	
	8:54778	
	8:54877	UCID—19866
	8:54948	
	8:55122	UCRL—53438
	8:55247	UCRL—89286
	8:55248	UCRL—89297
	8:55249	UCRL—89767
	8:55250	UCRL—89768
	8:55251	UCRL—89771
	8:55307	UCID—19837
	8:55308	UCRL—88209
	8:55309	UCRL—88667
	8:55310	UCRL—88811
	8:55311	UCRL—88916
	8:55312	UCRL—88964
	8:55313	UCRL—89296
	8:55314	UCRL—89745
	8:55315	UCRL—89750
	8:55316	UCRL—89769
	8:55342	UCRL—89754
W-7405-ENG-82	**Ames Lab., IA (USA)**	
	8:53387	IS-M—426
	8:54215	IS-M—455
	8:54216	IS-M—459
	8:54256	IS-M—429
	Iowa State Univ. of Science and Technology, Ames (USA)	
	8:54273	IS-M—420
	Ames Lab., IA (USA)	
	8:54274	IS-M—450
	8:54275	IS-M—453
	8:54276	IS-M—454
	8:54277	IS-M—457
	Iowa State Univ. of Science and Technology, Ames (USA)	
	8:54293	IS-M—427
	Ames Lab., IA (USA)	
	8:54294	IS-M—452
	8:54368	IS-M—439
	8:54531	IS-M—433
	8:54532	IS-M—440
	8:54533	IS-M—444
	8:54534	IS-M—445
	8:54535	IS-M—446
	8:54536	IS-M—449
	8:54537	IS-M—456
	8:55218	IS-M—435
	8:55223	IS-M—434

REPORT NUMBER INDEX

The numbers assigned to all reports cited in the publication appear in the first column of the index. Cross reference information and/or availability are included as appropriate. Abbreviations used in the availability column are elaborated at the end of the index. To expedite the filling of orders for reports from NTIS and TIC, an order number in the form, DE82000001, appears in column 3. Requesters are urged to use this order number where provided. In column 4, one or more DOE distribution categories are indicated, e.g. , STD-10, MN-25. STD indicates distribution was made in full-size copy; MN indicates microcopy distribution. These category numbers are included to assist DOE librarians in responding to requests for reports in their collections. The UC (Unclassified Distribution Categories) are defined in DOE/TIC-4500, available from TIC. The citation numbers are given in column 5. NOTE: DOE attempts to disseminate its information as broadly as possible. Even though a report may contain some degree of illegibility, it is believed that the report may still make a contribution. The presence of a 1, 2, or 3 following NTIS in the availability column denotes the extent to which a report may be illegible and the form in which it is available: 1 = 1 to 5% illegibility, available PC and MF; 2 = 6 to 10% illegibility, available MF only; 3 = 11% or more illegibility, available PC only.

Report No.	*Availability*	*Order No.*	*Distribution Category*	*Abstract No.*
AAEC/E-				
550	NTIS (US Sales Only), PC A04/MF A01	DE83703468	MN -70	8:53601
AD-				
875954/ 0	NTIS, PC A03/MF A01			8:55233
875968/ 0	NTIS, PC A02/MF A01			8:54868
AD-A-				
124900/ 2	NTIS, PC A06/MF A01			8:53799
125159/ 4	NTIS, PC A04/MF A01			8:54156
125180/ 0	NTIS, PC A21/MF A01			8:54125
126350/ 8	NTIS, PC A04/MF A01			8:53437
126366/ 4	NTIS, PC A06/MF A01			8:54491
126397/ 9	NTIS, PC A03/MF A01			8:55085
126461/ 3	NTIS, PC A02/MF A01			8:55102
126611/ 3	NTIS, PC A03/MF A01			8:54492
126617/ 0	NTIS, PC A02/MF A01			8:54126
126620/ 4	NTIS, PC A08/MF A01			8:54493
126652/ 7	NTIS, PC A05/MF A01			8:55345
126753/ 3	NTIS, PC A04/MF A01			8:55201
126770/ 7	NTIS, PC A09/MF A01			8:53755
126771/ 5	NTIS, PC A08/MF A01			8:53756
126864/ 8	NTIS, PC A03/MF A01			8:54568
126931/ 5	NTIS, PC A03/MF A01			8:55086
126937/ 2	NTIS, PC A03/MF A01			8:54569
126946/ 3	NTIS, PC A04/MF A01			8:54269
126999/ 2	NTIS, PC A03/MF A01			8:54266
127018/ 0	NTIS, PC A03/MF A01			8:54570
127031/ 3	NTIS, PC A02/MF A01			8:54270
127032/ 1	NTIS, PC A03/MF A01			8:55087
127075/ 0	NTIS, PC A02/MF A01			8:54494
127120/ 4	NTIS, PC A04/MF A01			8:54869
127122/ 0	NTIS, PC A02/MF A01			8:55088
127135/ 2	NTIS, PC A03/MF A01			8:54370
127139/ 4	NTIS, PC A04/MF A01			8:54754
127229/ 3	NTIS, PC A03/MF A01			8:54271
127239/ 2	NTIS, PC A07/MF A01			8:54194
127269/ 9	NTIS, PC A03/MF A01			8:54371
127303/ 6	NTIS, PC A08/MF A01			8:54755
127379/ 6	NTIS, PC A03/MF A01			8:54756
127412/ 5	NTIS, PC A06/MF A01			8:54495
127426/ 5	NTIS, PC A02/MF A01			8:54496
128080/ 9	NTIS, PC A04/MF A01			8:54939
128190/ 6	NTIS, PC A03/MF A01			8:54645
128242/ 5	NTIS, PC A03/MF A01			8:54571
128254/ 0	NTIS, PC A03/MF A01			8:55254
128255/ 7	NTIS, PC A03/MF A01			8:53443
128280/ 5	NTIS, PC A02/MF A01			8:54497
128396/ 9	NTIS, PC A05/MF A01			8:54872
128408/ 2	NTIS, PC A12/MF A01			8:54195
128422/ 3	NTIS, PC A03/MF A01			8:54196
128486/ 8	NTIS, PC A02/MF A01			8:54252
128493/ 4	NTIS, PC A07/MF A01			8:54873
128532/ 9	NTIS, PC A04/MF A01			8:54148
128533/ 7	NTIS, PC A03/MF A01			8:54498
128534/ 5	NTIS, PC A02/MF A01			8:54499
128623/ 6	NTIS, PC A04/MF A01			8:54500
128658/ 2	NTIS, PC A03/MF A01			8:54197
128715/ 0	NTIS, PC A04/MF A01			8:54784
128748/ 1	NTIS, PC A03/MF A01			8:54127
128759/ 8	NTIS, PC A04/MF A01			8:55255
128764/ 8	NTIS, PC A04/MF A01			8:54157

Report No.	Availability	Order No.	Distribution Category	Abstract No.
128772/ 1	NTIS, PC A03/MF A01			8:53420
128795/ 2	NTIS, PC A12/MF A01			8:55346
128876/ 0	NTIS, PC A08/MF A01			8:55219
128922/ 2	NTIS, PC A03/MF A01			8:55234
128969/ 3	NTIS, PC A09/MF A01			8:55347
129004/ 8	NTIS, PC A02/MF A01			8:54501
129057/ 6	NTIS, PC A03/MF A01			8:54206
129140/ 0	NTIS, PC A13/MF A01			8:55348
129176/ 4	NTIS, PC A04/MF A01			8:54207
129320/ 8	NTIS, PC A13/MF A01			8:55097
129402/ 4	NTIS, PC A05/MF A01			8:53438
129442/ 0	NTIS, PC A02/MF A01			8:54502
129465/ 1	NTIS, PC A03/MF A01			8:55235
129467/ 7	NTIS, PC A07/MF A01			8:54503
129478/ 4	NTIS, PC A03/MF A01			8:54504
129527/ 8	NTIS, PC A02/MF A01			8:54505
129546/ 8	NTIS, PC A03/MF A01			8:54870
129571/ 6	NTIS, PC A02/MF A01			8:54506
129600/ 3	NTIS, PC A04/MF A01			8:55220
129624/ 3	NTIS, PC A05/MF A01			8:54372
129723/ 3	NTIS, PC A02/MF A01			8:55256
129732/ 4	NTIS, PC A09/MF A01			8:54124
129735/ 7	NTIS, PC A07/MF A01			8:53748
129758/ 9	NTIS, PC A02/MF A01			8:55103
129771/ 2	NTIS, PC A09/MF A01			8:53749
129774/ 6	NTIS, PC A03/MF A01			8:55257
129785/ 2	NTIS, PC A03/MF A01			8:55258
129832/ 2	NTIS, PC A03/MF A01			8:55104
129836/ 3	NTIS, PC A08/MF A01			8:53750
129840/ 5	NTIS, PC A07/MF A01			8:53751
129842/ 1	NTIS, PC A04/MF A01			8:55089
129856/ 1	NTIS, PC A04/MF A01			8:54517
129873/ 6	NTIS, PC A03/MF A01			8:55090
129880/ 1	NTIS, PC A13/MF A01			8:54373
129887/ 6	NTIS, PC A03/MF A01			8:53954
129907/ 2	NTIS, PC A03/MF A01			8:54351
129908/ 0	NTIS, PC A02/MF A01			8:54352
129909/ 8	NTIS, PC A02/MF A01			8:54353
129910/ 6	NTIS, PC A02/MF A01			8:54354
129911/ 4	NTIS, PC A02/MF A01			8:54355
129912/ 2	NTIS, PC A03/MF A01			8:54356
129913/ 0	NTIS, PC A03/MF A01			8:54357
129914/ 8	NTIS, PC A02/MF A01			8:54358
129915/ 5	NTIS, PC A03/MF A01			8:54359
129916/ 3	NTIS, PC A03/MF A01			8:54360
129921/ 3	NTIS, PC A03/MF A01			8:55091
129922/ 1	NTIS, PC A03/MF A01			8:55098
129963/ 5	NTIS, PC A07/MF A01			8:54128
129995/ 7	NTIS, PC A02/MF A01			8:54507
130036/ 7	NTIS, PC A02/MF A01			8:54508
130115/ 9	NTIS, PC A03/MF A01			8:55092
130116/ 7	NTIS, PC A02/MF A01			8:55099
130127/ 4	NTIS, PC A02/MF A01			8:54572
130135/ 7	NTIS MF A01			8:55100
130141/ 5	NTIS, PC A02/MF A01			8:54757
130149/ 8	NTIS, PC A03/MF A01			8:54573
130165/ 4	NTIS, PC A07/MF A01			8:54871
AD-P-				
000770/ 8	NTIS, PC A02/MF A01			8:55068
000772/ 4	NTIS, PC A02/MF A01			8:53383
000792/ 2	NTIS, PC A02/MF A01			8:54940
000794/ 8	NTIS, PC A02/MF A01			8:54158
AECB-				
1130	NTIS (US Sales Only), PC A03/MF A01	DE83703437	MN -41	8:54072
AERE-M-				
3251	NTIS (US Sales Only), PC A02/MF A01	DE83703431	MN -25	8:54267
AERE-R-				
10556	NTIS (US Sales Only), PC A02/MF A01	DE83703575	MN -2	8:55084
10599	NTIS (US Sales Only), PC A03/MF A01	DE83703469	MN -70	8:53602
10665	NTIS (US Sales Only), PC A03/MF A01	DE83703471	MN -70	8:53603
AFGL-ERP-				
816	*See* AD-A-130115/9			8:55092
AFGL-TR-				
82-0396	*See* AD-A-130115/9			8:55092
AFIT/GNE/PH-				
83M-5	*See* AD-A-127303/6			8:54755
AFLRL-				
122	*See* AD-A-127239/2			8:54194
AMMRC-TR-				
83-7	*See* AD-A-126617/0			8:54126
ANL-				
83-11-Vol.2	*See* NUREG/CR-3359-Vol.2	DE83018253	MN -79d	8:54033
ANL/CNSV-				
41	NTIS, PC A06/MF A01; 1	DE83017530	STD -95f	8:54159

Report No.	Availability	Order No.	Distribution Category	Abstract No.
ANL/EES-TM-				
232	NTIS, PC A05/MF A01; 1	DE83017991	MN -90i	8:53411
ANL/FE-				
83-13	NTIS, PC A14/MF A01; 1	DE83017732	MN -90c	8:53856
83-14	NTIS, PC A15/MF A01; 1	DE83017736	MN -90c	8:53857
ANL-HEP-CP-				
82-24	NTIS, PC A21/MF A01; 1	DE83009572	MN -34C	8:55123
83-47	NTIS, PC A02/MF A01; 1	DE83017929	MN -28	8:54574
ANL-Trans-				
1204	NTIS, PC A02/MF A01; 1	DE82021364	MN -25	8:54545
ARL/TR-				
047	NTIS (US Sales Only), PC A02/MF A01	DE83703439	MN -41	8:54998
048	NTIS (US Sales Only), PC A03/MF A01	DE83703440	MN -41	8:54999
049	NTIS (US Sales Only), PC A04/MF A01	DE83703432	MN -51	8:54919
051	NTIS (US Sales Only), PC A03/MF A01	DE83703441	MN -41	8:55002
BMFT-FB-T-				
83-159	NTIS (US Sales Only), PC A06/MF A01	DE83751328	MN -95d	8:54129
BNL-				
32183	NTIS, PC A02/MF A01	DE83004598	MN -11	8:54878
32362	NTIS, PC A02/MF A01	DE83017751	MN -28	8:54631
33116	NTIS, PC A03/MF A01; 1	DE83013279	MN -28	8:54596
33472	NTIS, PC A02/MF A01; 1	DE83017345	MN -34A	8:55105
33487	NTIS, PC A02/MF A01; 1	DE83017351	MN -28	8:54632
33493	NTIS, PC A02/MF A01; 1	DE83017352	MN -34	8:55217
33518	NTIS, PC A03/MF A01; 1	DE83017625	MN -78	8:53867
33532	NTIS, PC A02/MF A01	DE83017578	MN -28	8:54575
33533	NTIS, PC A02/MF A01	DE83017579	MN -95d	8:54083
33534	NTIS, PC A02/MF A01	DE83017580	MN -34A	8:55106
33535	NTIS, PC A02/MF A01	DE83017581	MN -28	8:54576
33536	NTIS, PC A02/MF A01; 1	DE83017582	MN -28	8:54597
33539	NTIS, PC A02/MF A01	DE83017583	MN -90b	8:53412
33554	NTIS, PC A02/MF A01	DE83017626	MN -48	8:54966
33561	NTIS, PC A02/MF A01	DE83017584	MN -48	8:54967
33590	NTIS, PC A02/MF A01; 1	DE83017766	MN -28	8:54374
33591	NTIS, PC A02/MF A01	DE83017765	MN -28	8:54633
33592	NTIS, PC A02/MF A01	DE83017759	MN -38	8:54375
33593	NTIS, PC A02/MF A01	DE83017764	MN -38	8:54376
33597	NTIS, PC A02/MF A01	DE83017343	MN -4	8:54291
33649	NTIS, PC A02/MF A01	DE83014055	MN -34D	8:55157
33651	NTIS, PC A02/MF A01	DE83014054	MN -28	8:54634
33659	NTIS, PC A02/MF A01;1	DE83018275	MN -34D	8:55127
33666	NTIS, PC A02/MF A01	DE83018297	MN -25	8:54208
51568	NTIS, PC A04/MF A01	DE84000848	STD -98F	8:54090
51575	NTIS, PC A05/MF A01; 1	DE83018218	STD -96	8:54149
51599	NTIS, PC A05/MF A01	DE83017827	STD -63	8:53788
51686	NTIS, PC A03/MF A01	DE83017690	STD -94d	8:53734
BNL-NCS-				
51684	NTIS, PC A03/MF A01	DE83017884	STD -34C	8:55160
BNL-NUREG-				
33530	NTIS, PC A02/MF A01; 1	DE83017577	MN -77	8:53985
33574	NTIS, PC A02/MF A01	DE83017586	MN -80	8:53986
51494-Vol.4	*See* NUREG/CR-2482-Vol.4	DE83018273	MN -70	8:53652
51630-Vol.2	*See* NUREG/CR-3091-Vol.2	DE83017468	MN -70	8:53653
BNL-tr-				
1005	NTIS, PC A02/MF A01; 1	DE83017723	MN -37	8:54490
1006	NTIS, PC A04/MF A01; 1	DE83017622	MN -61	8:53737
1009	NTIS, PC A08/MF A01; 1	DE83017201	MN -25	8:54246
BPA-				
82-8	*See* DOE/BP-167	DE83018259	MN -60	8:53843
82-8-App.	*See* DOE/BP-168	DE83018258	MN -60	8:53844
CAPE-				
2867	USDOE-TIC, PO Bx 62, Oak Ridge, TN 37830		ND -28	8:54598
2868	USDOE-TIC, PO Bx 62, Oak Ridge, TN 37830		ND -28	8:54599
2869	USDOE-TIC, PO Bx 62, Oak Ridge, TN 37830		ND -28	8:54635
2870	USDOE-TIC, PO Bx 62, Oak Ridge, TN 37830		ND -28	8:54600
2871	USDOE-TIC, PO Bx 62, Oak Ridge, TN 37830		ND -28	8:54668
2872	USDOE-TIC, PO Bx 62, Oak Ridge, TN 37830		ND -28	8:54601
2873	USDOE-TIC, PO Bx 62, Oak Ridge, TN 37830		ND -28	8:54636
CE-Trans-				
7880	NTIS (US Sales Only), PC A02/MF A01	DE83902753	MN -80	8:53933
CEA-CONF-				
6523	NTIS (US Sales Only), PC A02/MF A01	DE83703039	MN -79	8:53987
6529	NTIS (US Sales Only), PC A02/MF A01	DE83703470	MN -70	8:53605
6530	NTIS (US Sales Only), PC A02/MF A01	DE83703087	MN -70	8:53606
6560	NTIS (US Sales Only), PC A02/MF A01	DE83703569	MN -37	8:54669
6561	NTIS (US Sales Only), PC A02/MF A01	DE83703566	MN -25	8:54971
6581	NTIS (US Sales Only), PC A02/MF A01	DE83703542	MN -20	8:55259
6604	NTIS (US Sales Only), PC A02/MF A01	DE83703547	MN -34C	8:55197
CEA-N-				
2310	NTIS (US Sales Only), PC A07/MF A01	DE83703474	MN -32	8:55230
2314	NTIS (US Sales Only), PC A04/MF A01	DE83703472	MN -32	8:55328
2322	NTIS (US Sales Only), PC A02/MF A01	DE83703473	MN -32	8:55329
2323	NTIS (US Sales Only), PC A07/MF A01	DE83703452	MN -37	8:54670
CEA-R-				
5168	NTIS (US Sales Only), PC A04/MF A01	DE83703453	MN -37	8:54671

Report No.	Availability	Order No.	Distribution Category	Abstract No.
CEA-tr-				
2-687-5	CEN Saclay, Service de Documentation, 91191 - Gif-sur-Yvette Cedex (France)		ND -79	8:53951
3-257-6	CEN Saclay, Service de Documentation, 91191 - Gif-sur-Yvette Cedex (France)		ND -37	8:54978
CEND-				
413	*See* DOE/ET/34010-9	DE83017809	MN -78	8:53874
CERL-TR-E-				
183	*See* AD-A-129963/5			8:54128
CERN-				
82-10	NTIS (US Sales Only), PC A15/MF A01	DE83702973	MN -25	8:54272
82-13	NTIS (US Sales Only), PC A03/MF A01	DE83703062	MN -37	8:54672
83-02	NTIS (US Sales Only), PC A10/MF A01	DE84780005	MN -34D	8:55133
CGR/DC-				
14/ 82	*See* AD-A-126350/8			8:53437
CINDA-				
63	*See* AD-A-129176/4			8:54207
CINDAS-TPRC-				
28	*See* AD-A-129057/6			8:54206
CONF-7710240-	(Workshop/conference on conservation of energy resources, New York, NY, USA, 15 Oct 1977)			
	New York Academy of Sciences, 2 East 63rd Street, New York, NY 10021			8:54147
CONF-7909271-	(Coal liquefaction meeting, Tulsa, OK, USA, 1 Sep 1979)			
1	NTIS, PC A02/MF A01	DE83008416	MN -90d	8:53334
CONF-791235-	(5. geothermal reservoir engineering workshop, Stanford, CA, USA, 12-14 Dec 1979)			
	See SGP-TR-40	DE83012133	MN -66	8:53837
CONF-800194-	(3. meeting on ultra high vacuum techniques for accelerators and storage rings, Oho, Ibaraki, Japan, 24-25 Jan 1980)			
	See KEK-81-20	DE83703003	MN -28	8:54618
CONF-8006216-	(Heat Transfer and Fluid Mechanics Institute conference, Los Angeles, CA, USA, 23-25 Jun 1980)			
	NTIS, PC A12/MF A01; 1	DE83012805	MN -38	8:54519
CONF-801144-	(International meeting on development, fabrication, and application of reduced-enrichment fuels for research and test reactors, Argonne, IL, USA, 13-14 Nov 1980)			
5	NTIS, PC A02/MF A01; 1	DE83017967	MN -80	8:53955
6	NTIS, PC A02/MF A01	DE83017971	MN -80	8:53956
7	NTIS, PC A02/MF A01	DE83016923	MN -80	8:53957
8	NTIS, PC A03/MF A01; 1	DE83017286	MN -80	8:53958
9	NTIS, PC A02/MF A01	DE83017214	MN -80	8:53959
10	NTIS, PC A02/MF A01	DE83017254	MN -80	8:53960
11	NTIS, PC A03/MF A01; 1	DE83017970	MN -80	8:53961
CONF-810188-	(ACS symposium on aids to use of multiple online files, Washington, DC, USA, 7-9 Jan 1981)			
1-Draft	NTIS, PC A15/MF A01	DE83017212	MN -32	8:55330
CONF-810214-	(4. topical conference on radio frequency plasma heating, Austin, TX, USA, 9-10 Feb 1981)			
15-DRAFT	NTIS, PC A02/MF A01	DE83017256	MN -20a	8:55260
CONF-810602-	(7. symposium on detonation, Annapolis, MD, USA, 16-19 Jun 1981)			
	NTIS, PC A99/MF A01; 1	DE83008949	MN -13	8:54785
CONF-8106311-	(PAFEC user's conference, Knoxville, TN, USA, 9 Jun 1981)			
2-Draft	NTIS, PC A02/MF A01; 1	DE83017250	MN -20b	8:55284
CONF-810812-	(16. intersociety energy conversion engineering conference (IECEC), Atlanta, GA, USA, 9-14 Aug 1981)			
60	*See* SERI/TP-611-1241	DE83003711	MN -63	8:53782
CONF-8108168-	(North Atlantic Region meeting of the American Society of Agricultural Engineers, St. Catherines, Canada, 9-13 Aug 1981)			
1	NTIS, PC A02/MF A01	DE83902935	MN -96	8:54198
CONF-8110281-	(12. INDC meeting, Vienna, Austria, 5-9 Oct 1981)			
1	*See* INDC-37/U	DE83703553	MN -34C	8:55161
CONF-820180-	(Fusion power coordinating committee meeting, Los Angeles, CA, USA, 27 Jan 1982)			
1	NTIS, PC A02/MF A01; 1	DE83017182	MN -20	8:55236
CONF-8204133-	(Workshop on instrumentation of the disassembled BER II, Berlin, F.R. Germany, 19-20 Apr 1982)			
	See HMI-B-388	DE83751055	MN -80	8:53983
CONF-8204141-	(Data acquisition for fusion devices workshop (FEDC), Oak Ridge, TN, USA, 14-15 Apr 1982)			
1	NTIS, PC A02/MF A01; 1	DE83017225	MN -20a	8:55285
CONF-820546-	(9. international cryogenic engineering conference, Kobe, Japan, 10-14 May 1982)			
15	*See* JINR-R-9-82-383	DE83702993	MN -28	8:54613
17	*See* LBL-14178	DE83017518	MN -25	8:54219
CONF-8205194-	(IAEA meeting on nuclear structure and decay data, Zeist, Netherlands, 11-14 May 1982)			
Summ.	*See* INDC(NDS)-133/NE	DE83703551	MN -34C	8:55162
CONF-820618-	(International conference on plasma physics, Goeteborg, Sweden, 7-21 Jun 1982)			
	Nucl. Fusion, 23: No. 5, 671-681(May 1983)			8:55252

Report No.	Availability	Order No.	Distribution Category	Abstract No.
CONF-820653-	(IAEA specialists' meeting on gas-cooled reactor core and high temperature instrumentation, Cumbria, UK, 15-17 Jun 1982)			
3	*See* IAEA-TC-389/6-10	DE83703018	MN -80	8:53883
4	*See* IAEA-TC-389/6-11	DE83703019	MN -80	8:53884
5	*See* IAEA-TC-389/6-14	DE83703021	MN -80	8:53885
6	*See* IAEA-TC-389/6-15	DE83703022	MN -80	8:53886
7	*See* IAEA-TC-389/6-16	DE83703023	MN -80	8:53887
8	*See* IAEA-TC-389/6-17	DE83703024	MN -80	8:53888
9	*See* IAEA-TC-389/6-2	DE83703025	MN -80	8:53878
10	*See* IAEA-TC-389/6-21	DE83703026	MN -80	8:53889
11	*See* IAEA-TC-389/6-24	DE83703027	MN -80	8:53938
12	*See* IAEA-TC-389/6-25	DE83703028	MN -80	8:53894
13	*See* IAEA-TC-389/6-26	DE83703029	MN -80	8:53931
14	*See* IAEA-TC-389/6-3	DE83703030	MN -80	8:53930
15	*See* IAEA-TC-389/6-4	DE83703031	MN -80	8:53879
16	*See* IAEA-TC-389/6-5	DE83703032	MN -80	8:53880
17	*See* IAEA-TC-389/6-6	DE83703033	MN -80	8:53881
18	*See* IAEA-TC-389/6-8	DE83703034	MN -80	8:53882
Summ.	*See* IWGGCR-5	DE83703568	MN -77	8:53890
CONF-8206123-	(Workshop on proton decay experiments, Argonne, IL, USA, 7-11 Jun 1982)			
	See ANL-HEP-CP-82-24	DE83009572	MN -34C	8:55123
CONF-8206196-	(International symposium on agrochemicals: fate in food and the environment using isotope techniques, Rome, Italy, 7 Jun-11 Jul 1982)			
	Vienna; IAEA (1982).			8:54997
CONF-8206214-	(National tar sands (heavy oil) symposium, Lexington, KY, USA, 10-11 Jun 1982)			
	NTIS, PC A12/MF A01; 1	DE83016809	MN -91	8:53448
CONF-8206219-	(NATO Advanced Study Institute on the atomic physics of highly ionized atoms, Cargese, France, 7-18 Jun 1982)			
1-Draft	NTIS, PC A04/MF A01	DE83017211	MN -20f	8:55239
CONF-820718-	(21. international conference on high energy physics, Paris, France, 29 Jul-8 Aug 1982)			
40	*See* JINR-E-1-82-352	DE83702955	MN -34C	8:55169
46	*See* JINR-R-1-82-353	DE83703544	MN -34D	8:55139
CONF-820789-	(Seminar on post accident debris cooling, Karlsruhe, F.R. Germany, 28-30 Jul 1982)			
1	*See* CEA-CONF-6523	DE83703039	MN -79	8:53987
CONF-820828-	(9. EPS Nuclear Physics Divisional conference on nuclear structure, Amsterdam, Netherlands, 29 Aug-4 Sep 1982)			
	Nucl. Phys. A, 396: 29c-36c(21 Mar 1983)			8:55176
	Nucl. Phys. A, 396: 437c-453c(21 Mar 1983)			8:55177
	Nucl. Phys. A, 396: 319c-328c(21 Mar 1983)			8:55192
CONF-8208147-	(SLAC summer school on high-energy particle accelerators, Stanford, CA, USA, 2-13 Aug 1982)			
4	*See* SLAC-PUB-2946	DE83007024	MN -28	8:54593
CONF-8208148-	(Governor's energy conference - Hawaii's energy options for the 80's, Honolulu, HI, USA, 15-18 Aug 1982)			
	NTIS, PC A13/MF A01; 1	DE83014621	MN -13	8:54053
CONF-8208155-	(Yamada conference on neutron scattering in condensed matter, Hakone, Japan, 31 Aug-4 Sep 1982)			
	Physica B+C (Amsterdam), 120: No. 1-3, 15-24(May 1983)			8:55117
	Physica B+C (Amsterdam), 120: No. 1-3, 25-30(May 1983)			8:55118
	Physica B+C (Amsterdam), 120: No. 1-3, 108-113(May 1983)			8:55205
CONF-8208156-	(NASA workshop, Palo Alto, CA, USA, 16-20 Aug 1982)			
1	*See* BNL-32183	DE83004598	MN -11	8:54878
CONF-8208157-	(American Society of Pharmacology and Experimental Therapeutics/Society of Toxicology meeting on innovative models in chemical teratogenesis, Louisville, KY, USA, 16-20 Aug 1982)			
1	NTIS, PC A02/MF A01	DE83015620	MN -48	8:55069
CONF-820942-	(Nuclear data for science and technology international conference, Antwerp, Belgium, 6-10 Sep 1982)			
33	*See* JINR-R-3-82-436	DE83702964	MN -34C	8:55187
CONF-820963-	(5. coordinated research meeting on measurement and evaluation of transactinium isotope nuclear data, Geel, Belgium, 1-3 Sep 1982)			
Summ	*See* INDC(NDS)-138/GE	DE83703552	MN -34C	8:55195
CONF-821005-	(DOE international decommissioning symposium, Seattle, WA, USA, 10-14 Oct 1982)			
	NTIS, PC A99/MF A01; 1	DE83008702	STD -70A	8:53988
CONF-821011-	(IEEE nuclear science symposium, Washington, DC, USA, 20-22 Oct 1982)			
52	*See* CEA-CONF-6561	DE83703566	MN -25	8:54971
53	*See* CEA-CONF-6560	DE83703569	MN -37	8:54669
CONF-8210115-	(Workshop on the use of electron rings for nuclear physics research, Lund, Sweden, 5-7 Oct 1982)			
9	*See* BNL-32362	DE83017751	MN -28	8:54631
CONF-8210149-	(Annual meeting of the international commission on glass, Toronto, Canada, 3-6 Oct 1982)			
1	*See* CEA-CONF-6530	DE83703087	MN -70	8:53606
2	*See* CEA-CONF-6529	DE83703470	MN -70	8:53605

Report No.	Availability	Order No.	Distribution Category	Abstract No.
CONF-8210188-	(European Federation of Chemical Engineers conference on energy, London, UK, 12-15 Oct 1982)			
1	*See* IS-M-426	DE83017674	MN -90i	8:53387
CONF-821155-	(International meeting on research and test reactor core conversions from HEU to LEU fuels, Argonne, IL, USA, 8-10 Nov 1982)			
9	NTIS, PC A02/MF A01	DE83017968	MN -80	8:54017
11	NTIS, PC A02/MF A01	DE83017139	MN -80	8:53962
12	NTIS, PC A02/MF A01	DE83017382	MN -80	8:53963
13	NTIS, PC A02/MF A01; 1	DE83017969	MN -80	8:53964
CONF-821170-	(Conference on laser induced damage in optical materials, Boulder, CO, USA, 15-18 Nov 1982)			
5	*See* CEA-CONF-6581	DE83703542	MN -20	8:55259
CONF-821185-	(Materials Research Society annual meeting, Boston, MA, USA, 16-19 Nov 1982)			
2	*See* DOE/ER/01198-1394	DE83003910	MN -34	8:54253
CONF-821197-	(12. international symposium on nuclear physics, Dresden, German D.R., 22-26 Nov 1982)			
1	*See* CEA-CONF-6604	DE83703547	MN -34C	8:55197
CONF-8211118-	(5. Ohio State University Washington conference on energy and national security, Arlington, VA, USA, 16-17 Nov 1982)			
Summ.	*See* DOE/ER/10178-2	DE83017287	MN -13	8:54088
CONF-830101-	(Epidemiology applied to health physics conference, Albuquerque, NM, USA, 10-14 Jan 1983)			
	NTIS, PC A24/MF A01; 1	DE83014383	STD -41	8:55003
CONF-830102-	(ASHRAE semi-annual meeting, Atlantic City, NJ, USA, 23-27 Jan 1983)			
1-Rev.	*See* LBL-13883-Rev.	DE83017524	MN -95d	8:54139
CONF-830103-	(2. international topical meeting on nuclear reactor thermal hydraulics (ANS), Santa Barbara, CA, USA, 11-13 Jan 1983)			
45	*See* PNL-SA-10781	DE83002725	MN -78	8:54035
CONF-830109-	(Topical meeting on optical techniques for remote probing of the atmosphere, Incline Village, NV, USA, 10-12 Jan 1983)			
3	NTIS, PC A02/MF A01	DE83007509	MN -34	8:53764
CONF-830140-	(18. Rencontre de Moriond conference, La Plagne, France, 23-29 Jan 1983)			
7	*See* SLAC-PUB-3099	DE83010776	MN -34D	8:55141
CONF-830141-	(Workshop on media with microstructure and wave propagation, Houghton, MI, USA, 24-25 Jan 1983)			
4	*See* SAND-83-1902C	DE83017823	MN -38	8:55228
CONF-830224-	(DPF workshop on collider detectors: present capabilities and future possibilities, Berkeley, CA, USA, 28 Feb-4 Mar 1983)			
	See LBL-15973	DE83015006	STD -37	8:54706
CONF-830301-	(ASME-JSME thermal engineering joint conference, Honolulu, HI, USA, 20-24 Mar 1983)			
19-Pt.2	*See* PNL-SA-9530-Pt.2	DE83008518	MN -12	8:54523
CONF-830303-	(185. American Chemical Society national meeting, Seattle, WA, USA, 20-25 Mar 1983)			
	American Chemical Society, Washington, DC, $8.00			8:53354
	Prepr. Pap. - Am. Chem. Soc., Div. Fuel Chem., 28: No. 1, 6-16(1983)			8:53355
	Prepr. Pap. - Am. Chem. Soc., Div. Fuel Chem., 28: No. 1, 55-61(1983)			8:53356
	Prepr. Pap. - Am. Chem. Soc., Div. Fuel Chem., 28: No. 1, 62-70(1983)			8:53357
	Prepr. Pap. - Am. Chem. Soc., Div. Fuel Chem., 28: No. 1, 77-84(1983)			8:53358
	Prepr. Pap. - Am. Chem. Soc., Div. Fuel Chem., 28: No. 1, 97-102(1983)			8:53359
	Prepr. Pap. - Am. Chem. Soc., Div. Fuel Chem., 28: No. 1, 148-160(1983)			8:53360
	Prepr. Pap. - Am. Chem. Soc., Div. Fuel Chem., 28: No. 1, 161-162(1983)			8:53361
	Prepr. Pap. - Am. Chem. Soc., Div. Fuel Chem., 28: No. 1, 44-48(1983)			8:53373
	Prepr. Pap. - Am. Chem. Soc., Div. Fuel Chem., 28: No. 1, 93-96(1983)			8:53374
	Prepr. Pap. - Am. Chem. Soc., Div. Fuel Chem., 28: No. 1, 103-117(1983)			8:53375
	Prepr. Pap. - Am. Chem. Soc., Div. Fuel Chem., 28: No. 1, 118-124(1983)			8:53376
	Prepr. Pap. - Am. Chem. Soc., Div. Fuel Chem., 28: No. 1, 125-130(1983)			8:53377
	Prepr. Pap. - Am. Chem. Soc., Div. Fuel Chem., 28: No. 1, 131-136(1983)			8:53378
	Prepr. Pap. - Am. Chem. Soc., Div. Fuel Chem., 28: No. 1, 137-140(1983)			8:53379
	Prepr. Pap. - Am. Chem. Soc., Div. Fuel Chem., 28: No. 1, 141-147(1983)			8:53380
	Prepr. Pap. - Am. Chem. Soc., Div. Fuel Chem., 28: No. 1, 163-167(1983)			8:53381
	Director of Publications, American Chemical Society, Fuel Division Preprints, 2994 Cottonwood Ct., Santa Clara, CA 95051, $8.00			8:53422

Report No.	Availability	Order No.	Distribution Category	Abstract No.
CONF-830311-	(Particle accelerator conference, Santa Fe, NM, USA, 21-23 Mar 1983)			
188	*See* LBL-15122	DE83017535	MN -28	8:54619
CONF-830317-	(TMS/AIME meeting, Atlanta, GA, USA, 6-10 Mar 1983)			
3	*See* DP-MS-82-55	DE83017494	MN -25	8:54210
CONF-830374-	(Moriond conference on electroweak interactions, Les Arcs, France, 13-19 Mar 1983)			
2	NTIS, PC A02/MF A01; 1	DE83017856	MN -34D	8:55134
CONF-830384-	(International symposium on nuclear physics at large tandem accelerators, Legnaro-Padova, Italy, 15-17 Mar 1983)			
2	NTIS, PC A02/MF A01; 1	DE83017914	MN -28	8:54603
CONF-830387-	(83. annual American Society of Microbiologists conference, New Orleans, LA, USA, 6-12 Mar 1983)			
2	*See* DP-MS-82-85	DE83017508	MN -48	8:55070
CONF-830388-	(Conference on analytical chemistry and applied spectroscopy, Atlantic City, NJ, USA, 6-12 Mar 1983)			
1	*See* IS-M-427	DE83017676	MN -4	8:54293
CONF-830389-	(Southeastern symposium on system theory, Huntsville, AL, USA, 28-29 Mar 1983)			
1	NTIS, PC A02/MF A01; 1	DE83017244	MN -20b	8:55261
CONF-830390-	(US/Japanese cooperative seminar, Honolulu, HI, USA, 14-18 Mar 1983)			
1	NTIS, PC A02/MF A01	DE83017553	MN -34A	8:55107
CONF-830406-	(5. topical meeting on technology of fusion energy, Knoxville, TN, USA, 26-28 Apr 1983)			
104	NTIS, PC A02/MF A01; 1	DE83017178	MN -20a	8:55237
107	*See* GA-A-17016	DE83017689	MN -20b	8:55290
108	*See* GA-A-17018	DE83017688	MN -20b	8:55291
109	*See* GA-A-17012	DE83017470	MN -20d	8:55289
110	*See* UCRL-88209	DE83017835	MN -21	8:55308
CONF-830419-	(16. rare earth research conference, Tallahassee, FL, USA, 18-21 Apr 1983)			
9	*See* IS-M-420	DE83017694	MN -25	8:54273
CONF-830420-	(Society of Photo-Optical Instrumentation Engineers conference, Arlington, VA, USA, 4-8 Apr 1983)			
5	*See* IS-M-434	DE83017692	MN -32	8:55223
CONF-830451-	(American Ceramic Society annual meeting, Chicago, IL, USA, 25-28 Apr 1983)			
24	*See* IS-M-429	DE83017681	MN -25	8:54256
CONF-830456-	(Symposium on quantum fluids and solids, Sanibel Island, FL, USA, 11-15 Apr 1983)			
3-Rev.	*See* LBL-15646-Rev.	DE83014858	MN -37	8:54764
CONF-830492-	(Association Francaise de Normalisation (AFNOR) meeting, Paris, France, 12 Apr 1983)			
1	NTIS, PC A02/MF A01	DE83011391	MN -13	8:55331
CONF-8304105-	(6. international tandem conference, Chester, UK, 16-23 Apr 1983)			
5	*See* BNL-33116	DE83013279	MN -28	8:54596
CONF-8304116-	(3. international conference on fluiid properties and phase equilibria for chemical process design, Atlanta, GA, USA, 10-15 Apr 1983)			
2	*See* LBL-16448	DE83017522	MN -4	8:53372
CONF-8304120-	(Atomic physics workshop, Oberstdorf, F.R. Germany, 1 Apr 1983)			
1	*See* BNL-33472	DE83017345	MN -34A	8:55105
CONF-8304123-	(Symposium on the health aspects of nuclear power plant incidents, New York, NY, USA, 7 Apr 1983)			
1	*See* BNL-33518	DE83017625	MN -78	8:53867
CONF-830528-	(7. international symposium on packaging and transportation of radioactive materials, New Orleans, LA, USA, 15-20 May 1983)			
27	*See* SAND-82-1998C	DE83013464	MN -71	8:53713
Summ.	NTIS, PC A21/MF A01; 1	DE83012390	MN -71	8:53477
CONF-830535-	(37. annual American Society for Quality Control congress, Boston, MA, USA, 24-26 May 1983)			
3	*See* PNL-SA-10382	DE83016924	MN -38	8:55327
CONF-830538-	(6. international conference on radiation shielding, Tokyo, Japan, 16-20 May 1983)			
18	NTIS, PC A02/MF A01; 1	DE83017912	MN -20d	8:55262
CONF-830557-	(ORNL workshop on calibration of actinide lung counters, Oak Ridge, TN, USA, 10-13 May 1983)			
6	*See* Y/DD-317	DE83017552	MN -41	8:55215
CONF-830573-	(2. international conference on radiation effects in insulators, Albuquerque, NM, USA, 30 May-3 Jun 1983)			
7	*See* SAND-83-0194C	DE83017485	MN -25	8:54281
CONF-830577-	(Digital Equipment Computer Users Society (DECUS) symposium, St. Louis, MO, USA, 23-27 May 1983)			
4	NTIS, PC A02/MF A01	DE83017945	MN -32	8:55332
CONF-830588-	(Delta-Nucleus dynamics symposium, Argonne, IL, USA, 2-4 May 1983)			
4	NTIS, PC A02/MF A01; 1	DE83017974	MN -34D	8:55145
CONF-8305127-	(Spring college on radiation in plasmas, Trieste, Italy, 24 May-17 Jun 1983)			
1	NTIS, PC A02/MF A01	DE83017177	MN -20b	8:55240

Report No.	Availability	Order No.	Distribution Category	Abstract No.
CONF-8305128-	(11. NASTRAN user's colloquium, San Francisco, CA, USA, 2-6 May 1983)			
1	NTIS, PC A02/MF A01	DE83017179	MN -20b	8:55286
CONF-830621-	(IEEE power electronics specialists conference, Albuquerque, NM, USA, 6-9 Jun 1983)			
41	*See* UCRL-88667	DE83017370	MN -21	8:55309
43	*See* UCRL-88671	DE83018005	MN -38	8:54554
CONF-830622-	(American Solar Energy Society meeting, Minneapolis, MN, USA, 1-3 Jun 1983)			
26	*See* DOE/NASA/20320-50	DE83017796	MN -60	8:53848
CONF-830639-	(12. transducer workshop, Melbourne, FL, USA, 7-9 Jun 1983)			
6	*See* SAND-83-0959C	DE83017482	MN -64	8:54769
CONF-830649-	(2. international corbicula symposium, Hot Springs, AR, USA, 21-24 Jun 1983)			
3	NTIS, PC A02/MF A01; 1	DE83015991	MN -80	8:53869
CONF-830653-	(ECRH transmission systems workshop, Germantown, MD, USA, 16 Jun 1983)			
	NTIS MF A01; 2	DE83014930	MN -20a	8:55263
CONF-830674-	(6. international Balaton topical conference on high energy nuclear physics, Balatonfured, Hungary, 6-11 Jun 1983)			
4	*See* LBL-16295	DE83017742	MN -34D	8:55152
CONF-830698-	(International Association of Energy Economists conference, Washington, DC, USA, 9-10 Jun 1983)			
2	*See* BNL-33533	DE83017579	MN -95d	8:54083
CONF-8306114-	(Workshop on nuclear astrophysics, Bad Wiessee, F.R. Germany, 6-10 Jun 1983)			
2	*See* LA-UR-83-2355	DE83017321	MN -34C	8:55189
CONF-8306116-	(Conference on ellipsometry and other optical methods for surface and thin film analysis, Paris, France, 7-10 Jun 1983)			
1-Rev.	*See* LBL-15918-Rev.	DE83015531	MN -38	8:54765
CONF-8306121-	(4. workshop on free-electron laser devices, Eastsound, WA, USA, 27 Jun-1 Jul 1983)			
1	*See* UCRL-89227	DE83017617	MN -28	8:54594
2	*See* LA-UR-83-2411	DE83017235	MN -34	8:54510
3	*See* LA-UR-83-2443	DE83017290	MN -34	8:54511
CONF-8306122-	(National Institute of Health workshop, Bethesda, MD, USA, 22-24 Jun 1983)			
1	NTIS, PC A03/MF A01	DE83017964	MN -48	8:54972
CONF-8306125-	(4. Adriatic meeting on particle physics, Dubrovnik, Yugoslavia, 6-16 Jun 1983)			
1	*See* BNL-33649	DE83014055	MN -34D	8:55157
CONF-830705-	(IEEE Power Engineering Society summer meeting, Los Angeles, CA, USA, 17-22 Jul 1983)			
5	*See* DOE/NASA/20320-48	DE83018232	STD -60	8:53847
CONF-830710-	(7. international conference of radiation research, Amsterdam, Netherlands, 3-8 Jul 1983)			
9	*See* DOE/EV/03861-48	DE83017395	MN -34	8:55114
CONF-830718-	(International Europhysics conference on high energy physics, Brighton, UK, 20-27 Jul 1983)			
6	*See* SLAC-PUB-3187	DE83018219	MN -34D	8:55142
8	*See* BNL-33659	DE83018275	MN -34D	8:55127
CONF-830719-	(American Physical Society meeting on shock waves in condensed media, Santa Fe, NM, USA, 18-21 Jul 1983)			
49	*See* UCRL-89750	DE83017366	MN -34	8:55315
51	*See* IS-M-454	DE83018075	MN -34	8:54276
CONF-830731-	(Hazardous materials management conference and exhibition, Philadelphia, PA, USA, 12-14 Jul 1983)			
1	NTIS, PC A02/MF A01	DE83017954	MN -69	8:54074
CONF-830747-	(ASTM Committee C-26 on nuclear fuel cycle, Quebec, Canada, 11-15 Jul 1983)			
1	*See* Y/DK-357	DE83017867	MN -4	8:54303
CONF-830763-	(9. AIRAPT conference, Albany, NY, USA, 25-29 Jul 1983)			
15	*See* IS-M-453	DE83018079	MN -34	8:54275
CONF-830770-	(NATO advanced research workshop on positron scattering in gases, London, UK, 19-23 Jul 1983)			
3	*See* BNL-33534	DE83017580	MN -34A	8:55106
CONF-830772-	(3. international conference on particle-induced X-ray emission (PIXE) and its analytical applications, Heidelberg, F.R. Germany, 18-22 Jul 1983)			
6	*See* LA-UR-83-2368	DE83017326	MN -34B	8:55094
CONF-830794-	(Conference on mathematics in biology and medicine, Bari, Italy, 18-22 Jul 1983)			
1	*See* BNL-33597	DE83017343	MN -4	8:54291
CONF-830795-	(Symposium on energy removal and particle control and toroidal fusion devices, Princeton, NJ, USA, 26-29 Jul 1983)			
3	NTIS, PC A02/MF A01	DE83017937	MN -20f	8:55281
CONF-830796-	(Workshop on statics and dynamics of nonlinear systems, Erice, Italy, 1-12 Jul 1983)			
1	*See* BNL-33493	DE83017352	MN -34	8:55217
CONF-830797-	(Workshop on high energy transients, Santa Cruz, CA, USA, 11-22 Jul 1983)			
1	*See* LA-UR-83-2486	DE83017297	MN -34B	8:55095

Report No.	Availability	Order No.	Distribution Category	Abstract No.
CONF-830798-	(3. LAMPF II workshop, Los Alamos, NM, USA, 18-29 Jul 1983)			
1	NTIS, PC A02/MF A01	DE83017215	MN -34D	8:55135
CONF-830811-	(Conference on quantitative NDE, Santa Cruz, CA, USA, 7-12 Aug 1983)			
4	*See* IS-M-439	DE83017691	MN -38	8:54368
5	*See* IS-M-440	DE83017685	MN -25	8:54532
7	*See* IS-M-456	DE83018073	MN -25	8:54537
8	*See* IS-M-444	DE83018082	MN -25	8:54533
9	*See* IS-M-445	DE83018081	MN -25	8:54534
10	*See* IS-M-446	DE83018080	MN -34	8:54535
11	*See* IS-M-449	DE83018076	MN -25	8:54536
12	*See* IS-M-455	DE83018074	MN -25	8:54215
CONF-830812-	(18. intersociety energy conversion engineering conference, Orlando, FL, USA, 21-26 Aug 1983)			
45	*See* PNL-SA-11354	DE83016784	MN -95f	8:54175
CONF-830816-	(International meeting on light-water reactor severe accident evaluation, Cambridge, MA, USA, 28 Aug-1 Sep 1983)			
35	NTIS, PC A02/MF A01	DE83017961	MN -78	8:54019
36	*See* SAND-83-0795C	DE83017820	MN -78	8:54036
CONF-830819-	(7. international conference on high voltage microscopy, Berkeley, CA, USA, 16-19 Aug 1983)			
	See LBL-16031	DE83016323	STD -25	8:54766
CONF-830822-	(12. international conference on high energy accelerators, Batavia, IL, USA, 11-16 Aug 1983)			
17	*See* BNL-33536	DE83017582	MN -28	8:54597
18	*See* BNL-33535	DE83017581	MN -28	8:54576
19	*See* BNL-33532	DE83017578	MN -28	8:54575
20	*See* BNL-33487	DE83017351	MN -28	8:54632
21	*See* LBL-16003	DE83017519	MN -28	8:54621
22	*See* LBL-15991	DE83017521	MN -28	8:54620
26	*See* ANL-HEP-CP-83-47	DE83017929	MN -28	8:54574
CONF-830824-	(1. international fluidized bed combustion and applied technology symposium, Beijing, China, 22-26 Aug 1983)			
1	*See* PNL-SA-11371	DE83017889	MN -90i	8:53428
CONF-830841-	(Cryogenic engineering conference and international cryogenic meterials conference, Colorado Springs, CO, USA, 15-19 Aug 1983)			
5	*See* LA-UR-83-2351	DE83017320	MN -38	8:54475
11	*See* UCRL-88811	DE83017368	MN -20b	8:55310
12	*See* BNL-33593	DE83017764	MN -38	8:54376
13	NTIS, PC A02/MF A01	DE83017973	MN -20c	8:55282
14	NTIS, PC A02/MF A01	DE83017138	MN -38	8:54471
15	NTIS, PC A02/MF A01	DE83017933	MN -38	8:54472
16	*See* BNL-33591	DE83017765	MN -28	8:54633
17	*See* BNL-33590	DE83017766	MN -28	8:54374
18	*See* BNL-33592	DE83017759	MN -38	8:54375
19	*See* LBL-15751	DE83017767	MN -38	8:54522
21	*See* LBL-16470	DE83017749	MN -38	8:54477
CONF-830845-	(Environmental degradation of materials in nuclear power systems-water reactors, Myrtle Beach, SC, USA, 22-24 Aug 1983)			
4	*See* BNL-33666	DE83018297	MN -25	8:54208
CONF-830847-	(Energy resource management '83, San Francisco, CA, USA, 23-27 Aug 1983)			
1	NTIS, PC A02/MF A01	DE83017927	MN -11	8:53439
CONF-830851-	(OCEANS '83 - effective use of the sea--an update, San Francisco, CA, USA, 29 Aug-1 Sep 1983)			
1	NTIS, PC A02/MF A01	DE83017962	MN -64	8:53794
CONF-830874-	(27. annual international technical symposium on high speed photography, videography and photonics, San Diego, CA, USA, 21-26 Aug 1983)			
18	*See* LA-UR-83-2291	DE83017606	MN -38	8:54763
20	*See* LA-UR-83-2400	DE83017234	MN -37	8:54539
21	*See* LA-UR-83-2399	DE83017233	MN -37	8:54538
23	*See* UCRL-89756	DE83017473	MN -38	8:54479
24	*See* UCRL-89738	DE83017629	MN -38	8:54478
25	*See* IS-M-452	DE83018078	MN -4	8:54294
26	NTIS, PC A02/MF A01	DE83017938	MN -59c	8:53815
CONF-830888-	(5. international conference on liquid and amorphous metals, Los Angeles, CA, USA, 15-19 Aug 1983)			
8	*See* SAND-83-1273C	DE83017353	MN -25	8:54239
CONF-830895-	(10. international conference on amorphous and liquid semiconductors, Tokyo, Japan, 22 Aug 1983)			
6	*See* IS-M-457	DE83018090	MN -25	8:54277
7	*See* IS-M-450	DE83018077	MN -25	8:54274
CONF-830899-	(Annual meeting of American Statistical Association and other statistical groups, Toronto, Canada, 15-18 Aug 1983)			
3	NTIS, PC A02/MF A01; 1	DE83017955	MN -32	8:55333
CONF-8308106-	(5th. annual participants information meeting of DOE low level waste management program, Denver, CO, USA, 30 Aug-1 Sep 1983)			
2	*See* MLM-3094(OP)	DE83016988	MN -70	8:53651
3	*See* MLM-3074(OP)	DE83016628	MN -70B	8:53650
4	NTIS, PC A02/MF A01	DE83017192	MN -70B	8:53642

Report No.	Availability	Order No.	Distribution Category	Abstract No.
5	*See* PNL-SA-11568	DE83017805	MN -70B	8:53678
CONF-8308107-	(3. Pan American symposium on fuels and chemicals by fermentation, Antigua, Guatemala, 24-26 Aug 1983)			
1	NTIS, PC A02/MF A01	DE83017251	MN -61a	8:53741
CONF-8308108-	(16. international conference on phenomena in ionized gases, Duesseldorft, F.R. Germany, 29 Aug-2 Sep 1983)			
1	NTIS, PC A02/MF A01; 1	DE83017272	MN -34A	8:55109
CONF-8308109-	(3. international congress on toxicology, San Diego, CA, USA, 28 Aug-3 Sep 1983)			
1	NTIS, PC A02/MF A01	DE83017274	MN -90i	8:53424
CONF-8308110-	(6. international congress on photosynthesis, Brussels, Belgium, 1-6 Aug 1983)			
1	NTIS, PC A02/MF A01	DE83017219	MN -48	8:54962
2	*See* BNL-33554	DE83017626	MN -48	8:54966
3	*See* BNL-33561	DE83017584	MN -48	8:54967
CONF-8308111-	(Conference on the future of nuclear power, Nara, Japan, 22-24 Aug 1983)			
1	NTIS, PC A02/MF A01	DE83017220	MN -86	8:53473
CONF-8308112-	(3. international Swarm seminar, Innsbruck, Austria, 3-5 Aug 1983)			
1	NTIS, PC A02/MF A01	DE83017206	MN -37	8:54550
2	NTIS, PC A02/MF A01	DE83017205	MN -34A	8:55110
CONF-8308113-	(2. biennial meeting of the Institute for Ultimate Reality and Meaning, Toronto, Canada, 17-20 Aug 1983)			
3	NTIS, PC A02/MF A01	DE83017951	MN -13	8:54057
CONF-8308114-	(Laser-based ultrasensitive spectroscopy and detection V conference, San Diego, CA, USA, 23 Aug 1983)			
1	*See* LA-UR-83-2319	DE83017303	MN -34A	8:55116
CONF-8308115-	(US/Canadian conference on forest responses to acidic deposition, Orono, ME, USA, 3-4 Aug 1983)			
1	NTIS, PC A03/MF A01	DE83017133	MN -11	8:54909
CONF-8308116-	(Workshop on the electrochemistry of carbon, Cleveland, OH, USA, 17-19 Aug 1983)			
1	*See* LBL-16514	DE83017744	MN -94cc	8:54049
CONF-8308120-	(2. solid oxide fuel cell workshop, Upton, NY, USA, 16-18 Aug 1983)			
1	NTIS, PC A02/MF A01	DE83017926	MN -93	8:54120
CONF-830908-	(11. European conference on controlled fusion and plasma physics, Aachen, F.R. Germany, 5-9 Sep 1983)			
5	*See* UCRL-89771	DE83017369	MN -20a	8:55251
CONF-830909-	(Course and workshop on mirror-based and field-reversed approaches to magnetic fusion, Varenna, Italy, 7-17 Sep 1983)			
3	*See* UCRL-89745	DE83017374	MN -20g	8:55314
4	*See* UCRL-89286	DE83016790	MN -20a	8:55247
5	*See* UCRL-89769	DE83017365	MN -20g	8:55316
6	*See* UCRL-89768	DE83017372	MN -20g	8:55250
7	*See* UCRL-89767	DE83017840	MN -20g	8:55249
8	*See* UCRL-89296	DE83017293	MN -20d	8:55313
9	*See* UCRL-89297	DE83017196	MN -20a	8:55248
CONF-830911-	(5. international conference on high power particle beams, San Francisco, CA, USA, 12-14 Sep 1983)			
3	*See* SAND-83-0524C	DE83017560	MN -34A	8:54566
4	*See* SAND-83-0609C	DE83017791	MN -21	8:55298
5	*See* SAND-83-0612C	DE83017822	MN -21	8:55300
6	*See* SAND-83-0564C	DE83017793	MN -21	8:55296
7	*See* SAND-83-0611C	DE83017792	MN -21	8:55299
8	*See* SAND-83-1992C	DE83018263	MN -21	8:55305
9	*See* SAND-83-0575C	DE83017824	MN -21	8:55297
10	*See* SAND-83-0620C	DE83017800	MN -21	8:55302
11	*See* SAND-83-1316C	DE83018264	MN -21	8:55304
12	*See* SAND-83-0617C	DE83017784	MN -21	8:55301
Abstr.	NTIS, PC A10/MF A01	DE83017620	MN -28	8:54604
CONF-830920-	(7. symposium on sources and ion assisted technology and 4. international conference on ion and plasma assisted techniques, Kyoto, Japan, 12-16 Sep 1983)			
8	*See* SLAC-PUB-3113	DE83014898	MN -28	8:55306
CONF-830929-	(8. national passive solar conference, Santa Fe, NM, USA, 5-10 Sep 1983)			
5	*See* SERI/TP-254-2027	DE83011989	STD -59c	8:53758
7	*See* PNL-SA-11509	DE83017868	MN -95d	8:54145
8	*See* PNL-SA-11502	DE83018298	MN -95d	8:54144
CONF-830936-	(Symposium on atomic spectroscopy (SAS-83), Berkeley, CA, USA, 12-16 Sep 1983)			
2	NTIS, PC A02/MF A01	DE83017963	MN -34A	8:55108
CONF-830942-	(3. topical meeting on fusion reactor materials, Albuquerque, NM, USA, 19-23 Sep 1983)			
3	*See* UCRL-89511	DE83017841	MN -70	8:53727
4	*See* SAND-83-0950C	DE83017790	MN -20c	8:55303
5	NTIS, PC A02/MF A01	DE83017278	MN -20c	8:55283
CONF-830975-	(International union of theoretical and applied mechanics conference on geomaterials: rocks, concretes, soils, Evanston, IL, USA, 11-15 Sep 1983)			
3	*See* SAND-83-1148C	DE83013770	MN -25	8:55081

Report No.	Availability	Order No.	Distribution Category	Abstract No.
CONF-8309103-	(9. international vacuum congress and 5. international conference on solid surfaces, Madrid, Spain, 26 Sep-1 Oct 1983)			
6	*See* UCRL-88964	DE83017367	MN -20	8:55312
7	*See* UCRL-88916	DE83017836	MN -20	8:55311
CONF-8309135-	(Computational engineering mechanics conference, Dalian, China, 4-10 Sep 1983)			
2	*See* SAND-83-1844C	DE83017158	MN -34	8:54524
CONF-8309136-	(Hydrogen in metals international meeting, Wroclaw, Poland, 20-23 Sep 1983)			
1	*See* IS-M-435	DE83017696	MN -34	8:55218
CONF-8309140-	(11. conference on process automation and instrumentation, Harmerville, PA, USA, 13-15 Sep 1983)			
1	*See* GA-A-17157	DE83016968	MN -20b	8:55292
CONF-8309141-	(International Nuclear Target Development Society conference, Eastsound, WA, USA, 7-10 Sep 1983)			
1	*See* UCRL-89776	DE83017839	MN -38	8:54771
CONF-8309143-	(6. international symposium on ceramics, Bologna, Italy, 26-29 Sep 1983)			
1	*See* LBL-16459	DE83017750	MN -25	8:54308
CONF-8309144-	(EPS conference on computing in accelerator design and operation, Berlin, F.R. Germany, 20-23 Sep 1983)			
2	*See* BNL-33651	DE83014054	MN -28	8:54634
CONF-831008-	(1. European conference on coal liquid mixtures, Cheltenham, UK, 5-6 Oct 1983)			
2	*See* BNL-33539	DE83017583	MN -90b	8:53412
CONF-831020-	(Electric Vehicle Council symposium and EXPO '83, Dearborn, MI, USA, 4-6 Oct 1983)			
2	NTIS, PC A02/MF A01; 1	DE83017939	MN -94ca	8:54046
3	NTIS, PC A02/MF A01	DE83017936	MN -94ca	8:54047
CONF-831047-	(American Nuclear Society winter meeting, San Francisco, CA, USA, 30 Oct-4 Nov 1983)			
84	*See* BNL-NUREG-33530	DE83017577	MN -77	8:53985
86	NTIS, PC A02/MF A01	DE83017941	MN -79p	8:54020
CONF-831063-	(American Institute of Chemical Engineers fall annual meeting, Washington, DC, USA, 30 Oct-3 Nov 1983)			
4	NTIS, PC A02/MF A01	DE83017909	MN -34B	8:54879
CONF-8310157-	(29. annual conference on bioassay, analytical and environmental chemistry, Seattle, WA, USA, 12-13 Oct 1983)			
1	NTIS, PC A02/MF A01	DE83017911	MN -37	8:54673
CONF-831104-	(National fuel cell seminar, Orlando, FL, USA, 13-16 Nov 1983)			
1	NTIS, PC A02/MF A01	DE83017925	MN -93	8:54117
CONF-831182-	(Electronic connector study group symposium, Philadelphia, PA, USA, 14-16 Nov 1983)			
1	*See* SAND-83-0665C	DE83017484	MN -38	8:54552
CONF-831187-	(MMM conference, Pittsburg, PA, USA, 8-11 Nov 1983)			
1	*See* IS-M-459	DE83018091	MN -25	8:54216
CONF-831216-	(Workshop on SPS fixed-target physics in the years 1984-1989, Geneva, Switzerland, 6-10 Dec 1983)			
Vol.1	*See* CERN-83-02	DE84780005	MN -34D	8:55133
CONS/NSF/42-1(Vol.2)	NTIS, PC A10/MF A01; 1	DE83017640	STD -95f	8:54042
COO-				
1195-475	*See* DOE/ER/01195-475	DE83018131	MN -32	8:55334
1195-478	*See* DOE/ER/01195-478	DE83017932	MN -32	8:55335
2529-22	*See* DOE/EV/12529-22	DE83018094	MN -11	8:54952
10591-4	*See* DOE/ER/10591-T1	DE83017779	MN -25	8:54254
CRN-CPR-				
82-17	NTIS (US Sales Only), PC A02/MF A01	DE83703454	MN -37	8:54674
CU-				
1533201	*See* AD-A-129320/8			8:55097
DESY-				
83-010	NTIS (US Sales Only), PC A02/MF A01	DE83751057	MN -34D	8:55136
83-012	NTIS (US Sales Only), PC A02/MF A01	DE83751058	MN -34D	8:55146
DESY-L-Trans-				
269	NTIS (US Sales Only), PC A03/MF A01	DE83781138	MN -34D	8:55143
271	NTIS (US Sales Only), PC A02/MF A01	DE83781137	MN -34D	8:55153
DIA-DST-				
2700Z-003-83	*See* AD-A-126620/4			8:54493
2700Z-004-83	*See* AD-A-129467/7			8:54503
DLCS-				
5000283	NTIS, PC A02/MF A01	DE83017576	MN -78	8:53873
DOE/AD/06185-T1	NTIS, PC A14/MF A01; 1	DE83017444	MN -98	8:54055
DOE/AL/10752-24	NTIS, PC A03/MF A01	DE83017565	MN -70	8:53580
DOE/BC/10308-30	NTIS, PC A05/MF A01	DE84000607	STD -92a	8:53431
DOE/BC/10309-16	NTIS, PC A03/MF A01; 1	DE84000525	STD -92a	8:53432
DOE/BP-				
137	NTIS, PC A07/MF A01	DE83017902	MN -60	8:53846
166-Vol.1	NTIS, PC A07/MF A01; 1	DE83017727	MN -95f	8:54180
166-Vol.2	NTIS MF A01; 2	DE83017728	MN -95f	8:54181
167	NTIS, PC A06/MF A01; 1	DE83018259	MN -60	8:53843

Report No.	Availability	Order No.	Distribution Category	Abstract No.
168	NTIS, PC A04/MF A01; 1	DE83018258	MN -60	8:53844
180	NTIS, PC A02/MF A01	DE83017908	MN -95d	8:54134
DOE/CA/10015-T1	NTIS, PC A07/MF A01; 1	DE83017354	MN -95	8:54192
DOE/CE-0045	NTIS MF A01; 2	DE83017539	MN -13	8:54135
DOE/CE/15094-T1	NTIS, PC A03/MF A01; 1	DE83016193	MN -95f	8:53858
DOE/CE/15095-3	NTIS, PC A03/MF A01; 1	DE83018210	STD -59	8:53801
DOE/CE/15126-T2	NTIS MF A01; 2	DE83017702	MN -95e	8:54182
T3	NTIS MF A01; 2	DE83017795	MN -95e	8:54183
DOE/CE/64832-T1	NTIS, PC A02/MF A01; 1	DE83018215	MN -95d	8:54136
DOE/CS/15024-T1	NTIS, PC A05/MF A01; 1	DE83016152	MN -59c	8:53818
DOE/CS/20192-T3	NTIS, PC A06/MF A01; 1	DE83018237	MN -95d	8:54184
DOE/CS/20531-T8	NTIS, PC A06; 3	DE83015062	ND -95d	8:54137
DOE/CS/24312-7	NTIS, PC A06/MF A01; 1	DE83017996	STD -95e	8:54185
DOE/CS/24355-T1	NTIS, PC A02/MF A01	DE83017551	MN -95d	8:54186
DOE/CS/30264-T1	NTIS, PC A06/MF A01	DE83015629	STD -59c	8:53819
DOE/CS/35147-T1	NTIS, PC A03/MF A01	DE83016950	MN -62c	8:53791
DOE/CS/40341-T2	NTIS, PC A02/MF A01	DE83017878	STD -95f	8:54160
T3	NTIS, PC A03/MF A01	DE83017879	STD -95f	8:54161
DOE/CS/40402-16	NTIS, PC A04/MF A01; 1	DE83016680	STD -95e	8:54162
DOE/CS/50277-T2	NTIS, PC A02/MF A01	DE83018262	MN -98F	8:54054
DOE/CS/54045-1-Vol.1-Summ.	NTIS, PC A04/MF A01	DE83017589	STD -90	8:53742
DOE/DP/40173-T1	NTIS, PC A05/MF A01	DE83017758	MN -34	8:54309
DOE/EIA-0130(83/ 08)	NTIS, PC A08/MF A01; 1 - GPO	DE83017566	MN -92	8:53445
0191(82)	NTIS, PC A09/MF A01; 1 - GPO	DE83017635	MN -98E	8:54095
0226(83/ 06)	NTIS, PC A03/MF A01 - GPO	DE83017852	MN -98E	8:54096
0347(82-83)	NTIS, PC A05/MF A01 - GPO	DE83018223	MN -98	8:53444
0354(82)	NTIS, PC A20/MF A01 - GPO	DE83017934	MN -98	8:54080
0380(83/ 08)	NTIS, PC A05/MF A01 - GPO	DE83018257	MN -98B	8:54058
0397(83/ 1Q)	NTIS, PC A14/MF A01 - GPO	DE83018243	MN -98E	8:54097
0401(Exec.)	NTIS, PC A03/MF A01; 1 - GPO	DE83018256	MN -98A	8:53413
0403	NTIS, PC A05/MF A01 - GPO	DE83018245	MN -98	8:53600
DOE/EP-0100	NTIS, PC A11/MF A01	DE83017542	STD -70A	8:53643
DOE/ER-0161	NTIS, PC A04/MF A01	DE83017880	STD -66e	8:54951
0173	NTIS, PC A02/MF A01	DE83017865	STD -37	8:54551
DOE/ER/01023-6	NTIS, PC A02/MF A01	DE83016388	MN -34D	8:53730
DOE/ER/01195-475	NTIS, PC A04/MF A01	DE83018131	MN -32	8:55334
478	NTIS, PC A08/MF A01	DE83017932	MN -32	8:55335
DOE/ER/01198-1394	NTIS, PC A02/MF A01; 1	DE83003910	MN -34	8:54253
DOE/ER/01545-338	NTIS, PC A02/MF A01	DE83017891	MN -34D	8:55155
DOE/ER/02289-T3	NTIS, PC A04/MF A01; 1	DE83017854	MN -34D	8:55137
DOE/ER/03065-T3	NTIS, PC A03/MF A01; 1	DE83017377	MN -34D	8:55138
DOE/ER/03077-179	NTIS, PC A03/MF A01	DE83017123	MN -20g	8:55287
DOE/ER/04426-6	NTIS, PC A02/MF A01	DE83017677	MN -4	8:55111
DOE/ER/04987-4	NTIS, PC A02/MF A01	DE83017465	MN -4	8:54306
DOE/ER/05016-5	NTIS, PC A02/MF A01	DE83017755	MN -4	8:54292
DOE/ER/05489-2	NTIS MF A01; 2	DE83017401	MN -34	8:54307
DOE/ER/10000-T1	NTIS, PC A14/MF A01; 1	DE83017376	MN -62a	8:53770
DOE/ER/10178-2	NTIS, PC A03/MF A01; 1	DE83017287	MN -13	8:54088
DOE/ER/10591-T1	NTIS, PC A06/MF A01	DE83017779	MN -25	8:54254
T2	NTIS, PC A06/MF A01; 1	DE83018250	MN -25	8:54255

Report No.	Availability	Order No.	Distribution Category	Abstract No.
DOE/ER/10596-3	NTIS, PC A02/MF A01	DE83017892	MN -64	8:54209
DOE/ER/10684-T1	NTIS, PC A03/MF A01	DE83016736	MN -48	8:54979
DOE/ER/10688-T1	NTIS, PC A02/MF A01	DE83017455	MN -37	8:54675
DOE/ER/10762-T1	NTIS, PC A02/MF A01	DE83017209	MN -70	8:55080
DOE/ER/10830-2	NTIS, PC A03/MF A01	DE83017564	MN -34A	8:55112
DOE/ER/10903-4	NTIS, PC A03/MF A01	DE83017447	MN -48	8:54963
DOE/ER/12032-02	NTIS, PC A02/MF A01	DE83018109	MN -94cc	8:54048
DOE/ER/13019-1	NTIS, PC A03/MF A01; 1	DE83017851	MN -63	8:53771
DOE/ER/53104-6	NTIS, PC A02/MF A01	DE83017467	MN -20a	8:55241
DOE/ER/53147-1	NTIS, PC A03/MF A01	DE83018120	MN -20f	8:55242
DOE/ER/60100-T1	NTIS, PC A02/MF A01	DE83017471	MN -92b	8:54880
DOE/ER/70038-5	NTIS, PC A02/MF A01	DE83017110	MN -34A	8:55113
DOE/ER/70185-T1	NTIS, PC A02/MF A01	DE83017433	MN -48	8:54981
DOE/ET/10324-T55	NTIS, PC A02/MF A01	DE83011007	MN -90c	8:53335
DOE/ET/10815-84	NTIS, PC A03/MF A01; 1	DE83017533	STD -90g	8:54113
DOE/ET/11041-T1	NTIS, PC A03/MF A01	DE83016248	STD -91	8:53460
DOE/ET/12047-T10	NTIS, PC A02/MF A01; 1	DE83015830	MN -92a	8:53433
DOE/ET/14146-T1	NTIS, PC A99/MF A01; 1	DE83016681	MN -88	8:53400
DOE/ET/14880-T4	NTIS, PC A03/MF A01	DE83016978	MN -90a	8:53366
DOE/ET/15295-T1	NTIS, PC A14/MF A01; 1	DE83017331	MN -90e	8:53384
DOE/ET/15614-T4	NTIS, PC A02/MF A01; 1	DE83017743	MN -90g	8:54114
DOE/ET/17091-1355	NTIS, PC A03/MF A01; 1	DE83006356	STD -90f	8:54557
1356	NTIS, PC A03/MF A01; 1	DE83006355	STD -90f	8:54558
DOE/ET/17093-1471	NTIS, PC A03/MF A01; 1	DE83017966	STD -90i	8:53385
DOE/ET/20279-240	NTIS, PC A16/MF A01; 1	DE83017776	STD -63	8:53790
DOE/ET/20587-T1	NTIS, PC A04/MF A01	DE83017193	MN -61a	8:53772
DOE/ET/20647-T1	NTIS, PC A03/MF A01	DE83017858	MN -13	8:54110
DOE/ET/23074-T2	NTIS MF A01; 2	DE83016437	MN -61a	8:53773
DOE/ET/23089-T2	NTIS, PC A13/MF A01; 1	DE83018239	MN -61a	8:53774
DOE/ET/29071-T5	NTIS MF A01; 2	DE83017441	MN -97a	8:53854
DOE/ET/29196-T1	NTIS, PC A08/MF A01; 1	DE83017479	MN -32	8:55221
T2	NTIS, PC A04/MF A01; 1	DE83017943	MN -32	8:55222
DOE/ET/34010-9	NTIS (US Sales Only), PC A03/MF A01; 1	DE83017809	MN -78	8:53874
DOE/ET/52040-T16	NTIS, PC A09/MF A01	DE83017803	MN -20	8:55243
DOE/ET/53043-6	NTIS, PC A03/MF A01; 1	DE83018118	MN -20d	8:55244
DOE/EV/03861-48	NTIS, PC A02/MF A01	DE83017395	MN -34	8:55114
DOE/EV/10402-T2	NTIS, PC A02/MF A01	DE83018072	MN -37	8:54676
DOE/EV/12529-22	NTIS, PC A04/MF A01	DE83018094	MN -11	8:54952
DOE/EV/70009-T1	NTIS, PC A06/MF A01; 1	DE83017804	MN -11	8:54941
T2	NTIS, PC A16/MF A01; 1	DE83017777	MN -11	8:54933
DOE/FC/10492-T1	NTIS, PC A05/MF A01; 1	DE83017534	STD -90i	8:53386
DOE/FE/55014-T3	NTIS, PC A08/MF A01; 1	DE83016156	MN -90c	8:53336
DOE/ID/01606-T1	NTIS, PC A04/MF A01	DE83017488	MN -48	8:53839
DOE/ID/01740-T1	NTIS, PC A03/MF A01; 1	DE83017680	MN -11	8:53394

Report No.	Availability	Order No.	Distribution Category	Abstract No.
DOE/ID/12140-T1	NTIS, PC A05/MF A01; 1	DE83017844	MN -96	8:53743
DOE/ID/12147-T1-Rev.	NTIS, PC A04/MF A01; 1	DE83012181	MN -66b	8:53841
DOE/ID/12371-4	NTIS, PC A03/MF A01	DE83017786	STD -70A	8:53644
DOE/IR/10430-T1	NTIS, PC A02/MF A01; 1	DE83017846	MN -95a	8:54193
DOE/JPL/954929-83/ 10	NTIS, PC A06/MF A01	DE84000032	STD -63b	8:53775
DOE/JPL/956133-83-1	NTIS, PC A02/MF A01	DE83016569	STD -63b	8:53776
DOE/JPL/956254-1	NTIS, PC A08/MF A01; 1	DE83016993	STD -63b	8:53777
DOE/LC/10678-T1	NTIS, PC A06/MF A01; 1	DE83017634	STD -91	8:53462
DOE/MC/11251-1442	NTIS, PC A04/MF A01; 1	DE83016342	STD -88	8:53430
DOE/MC/12233-T1	NTIS MF A01; 2	DE83017915	MN -90e	8:54559
DOE/MC/14129-1463	NTIS, PC A06/MF A01; 1	DE83015869	STD -90e	8:54560
DOE/MC/14731-1439	NTIS, PC A06/MF A01	DE83015428	STD -90c	8:53337
DOE/MC/19077-T3	NTIS, PC A07/MF A01; 1	DE83017563	MN -90c	8:54115
DOE/MC/19210-1453	NTIS, PC A04/MF A01; 1	DE83016869	STD -90a	8:53367
DOE/MC/19314-1474	NTIS, PC A02/MF A01	DE83018000	STD -90c	8:53368
DOE/METC-83-52	NTIS, PC A03/MF A01	DE83015796	STD -90i	8:53425
DOE/NASA/3255-1(7-81)	NTIS, PC A09/MF A01; 1	DE83017708	STD -90g	8:54116
DOE/NASA/20320-48	NTIS, PC A02/MF A01	DE83018232	STD -60	8:53847
50	NTIS (US Sales Only), PC A02/MF A01	DE83017796	MN -60	8:53848
DOE/NBB-0040	NTIS, PC A03/MF A01	DE83017873	STD -11	8:54881
0044	NTIS, PC A14/MF A01; 1	DE83017899	STD -11	8:54903
DOE/NBM-3012064	NTIS, PC A03/MF A01	DE83012064	MN -13	8:54059
3012066	NTIS, PC A03/MF A01; 1	DE83012066	MN -78	8:54021
3015766	NTIS, PC A02/MF A01; 1	DE83015766	MN -48	8:55039
3017872	NTIS, PC A03/MF A01	DE83017872	MN -2	8:54022
3018111	NTIS, PC A02/MF A01	DE83018111	MN -95d	8:54138
3018226	NTIS, PC A03/MF A01	DE83018226	MN -70	8:53645
3018252	International District Heating Association, 1735 Eye St., N.W., Washington, DC 20006		ND -95d	8:54190
DOE/PC/30013-10	NTIS, PC A05/MF A01	DE83017147	STD -90d	8:53399
DOE/PC/30089-T1	NTIS, PC A06/MF A01; 1	DE83006537	MN -90d	8:53414
DOE/PC/30209-T1	NTIS, PC A05/MF A01; 1	DE83017443	MN -90d	8:53338
T2	NTIS, PC A05/MF A01; 1	DE83017420	MN -90d	8:53339
T3	NTIS, PC A03/MF A01; 1	DE83017442	MN -90d	8:53340
T4	NTIS, PC A03/MF A01; 1	DE83017435	MN -90d	8:53341
DOE/PC/30222-T3	NTIS, PC A17/MF A01; 1	DE83017760	MN -90a	8:53369
DOE/PC/40784-T2	NTIS, PC A12/MF A01	DE83017544	STD -90d	8:53342
DOE/PC/40789-T7	NTIS, PC A02/MF A01	DE83017687	MN -90i	8:53370
DOE/PC/50784-T1	NTIS, PC A03/MF A01; 1	DE83017505	MN -90d	8:53343
DOE/PC/50786-T1	NTIS, PC A02/MF A01	DE83017481	MN -90d	8:53344
DOE/PC/50793-T3	NTIS, PC A03/MF A01	DE83016738	MN -90a	8:53345
DOE/RS/10307-1	NTIS, PC A05/MF A01	DE83017449	MN -61a	8:53746
DOE/RA/50146-T1	NTIS, PC A02/MF A01	DE83017452	MN -21	8:55288
DOE/RA/50239-T3-Rev.1	NTIS, PC A05/MF A01; 1	DE83017559	MN -66f	8:53834
DOE/RA/50259-T2	NTIS, PC A05/MF A01	DE83017033	MN -97c	8:54098
T3	NTIS, PC A02/MF A01	DE83016985	MN -97c	8:54099
T4	NTIS, PC A04/MF A01; 1	DE83017018	MN -97c	8:54100
T5	NTIS, PC A06/MF A01	DE83016984	MN -97c	8:54073
T6	NTIS, PC A05/MF A01; 1	DE83017019	MN -97c	8:54101
DOE/RG-0063	NTIS, PC A07/MF A01; 1	DE83017787	MN -90j	8:53859

Report No.	Availability	Order No.	Distribution Category	Abstract No.
DOE/RL/74032-				
7	NTIS, PC A06/MF A01	DE83017453	MN -80	8:53912
8	NTIS, PC A03/MF A01	DE83017454	MN -80	8:53913
DOE/SF/00515-				
T21	NTIS, PC A03/MF A01; 1	DE83017558	MN -28	8:54605
DOE/SF/10842-				
T1	NTIS, PC A04/MF A01	DE83017432	MN -95	8:54163
T2	NTIS, PC A09/MF A01; 1	DE83017469	MN -95	8:54164
DOE/TIC/EGC-				
83/ 3	NTIS$8.00 single copy (subscription item)		ND -13	8:55343
DP-MS-				
82-55	NTIS, PC A02/MF A01; 1	DE83017494	MN -25	8:54210
82-85	NTIS, PC A02/MF A01	DE83017508	MN -48	8:55070
DREO-				
859	*See* AD-A-128190/6			8:54645
DREO-TN-				
81-19	*See* AD-A-128422/3			8:54196
DTNSRDC/PAS-				
82-41	*See* AD-A-129856/1			8:54517
ECRC/M-				
1595	*See* PB-83-231951			8:53865
ECRC/R-				
1596	*See* PB-83-231571			8:53864
EFI-				
499(42) -81	NTIS (US Sales Only), PC A02/MF A01	DE83703455	MN -37	8:54677
500(43) -81	NTIS (US Sales Only), PC A03/MF A01	DE83703091	MN -32	8:54678
EHD-				
81-72	NTIS (US Sales Only), PC A05/MF A01	DE83703442	MN -41	8:55040
82-72	*See* EHD-81-72	DE83703442	MN -41	8:55040
EIR-				
485	NTIS (US Sales Only), PC A05/MF A01; 1	DE83751329	MN -98	8:54056
ENICO-				
1116-8-83	NTIS, PC A04/MF A01; 1	DE83016453	MN -11	8:53646
1134	NTIS, PC A03/MF A01	DE83017993	STD -70	8:53647
1136	NTIS, PC A03/MF A01	DE83018070	STD -70	8:53648
EPA-				
440/ 1-82/ 067-B	*See* PB-83-197921			8:54958
600/ 3-83-024	*See* PB-83-207407			8:53860
600/ 3-83-041	*See* PB-83-229013			8:54876
600/ 8-83-013A	*See* PB-83-217786			8:55071
600/ D-83-045	*See* PB-83-206961			8:54910
EPA-AA-TEB-				
511-82-14	*See* PB-83-194381			8:54201
ERA-				
80-8	*See* ERATL-83/15			8:54165
ERATL-				
83/ 15	NTIS$760.00			8:54165
EUR-				
7157-EN	NTIS PC E08/MF E08			8:55041
7821-EN	*See* PB-83-198895			8:54238
8191-EN	European Community Information Service, 2100 M Street, NW, Suite 707, Washington, DC 20037		ND -25	8:54211
FE-				
2778-72	*See* DOE/ET/10324-T55	DE83011007	MN -90c	8:53335
7091-30	*See* DOE/ET/17091-1355	DE83006356	STD -90f	8:54557
7091-31	*See* DOE/ET/17091-1356	DE83006355	STD -90f	8:54558
FEI-				
1288	NTIS (US Sales Only), PC A02/MF A01	DE83703092	MN -32	8:53896
1299	NTIS (US Sales Only), PC A02/MF A01	DE83703014	MN -80	8:53928
1300	NTIS (US Sales Only), PC A02/MF A01	DE83703093	MN -32	8:53914
1302	NTIS (US Sales Only), PC A02/MF A01	DE83703557	MN -25	8:54212
1307	NTIS (US Sales Only), PC A02/MF A01	DE83703558	MN -25	8:54213
GA-A-				
17012	NTIS, PC A02/MF A01	DE83017470	MN -20d	8:55289
17016	NTIS, PC A02/MF A01; 1	DE83017689	MN -20b	8:55290
17018	NTIS, PC A02/MF A01; 1	DE83017688	MN -20b	8:55291
17157	NTIS, PC A02/MF A01; 1	DE83016968	MN -20b	8:55292
GCRA-				
83-009	NTIS, PC A09/MF A01; 1	DE83015895	MN -77	8:53910
GJBX-				
28(83)	NTIS PC E03/MF A01	DE83017525	MN -51	8:54781
37(83) -Vol.1	NTIS PC E12/MF $6.50	DE83017917	MN -51	8:53464
37(83) -Vol.2	NTIS, PC A14/MF A01	DE83017526	MN -51	8:53465
GKSS-				
82/ E/ 28	Available from GKSS-Forschungszentrum Geesthacht G.m.b.H., Geesthacht-Tesperhude (Germany, F.R.)			8:54214
83/ E/ 8	NTIS (US Sales Only), PC A03/MF A01	DE83751056	MN -78	8:54023
GL-				
3520	*See* AD-A-128533/7			8:54498
GP-R-				
221020-Vol.1	*See* NUREG/CR-3371-Vol.1	DE83910862	MN -80	8:53944
221020-Vol.2	*See* NUREG/CR-3371-Vol.2	DE83910813	MN -78	8:53945
GRS-F-				
121	NTIS (US Sales Only), PC A03/MF A01	DE83751048	MN -80	8:54024

Report No.	Availability	Order No.	Distribution Category	Abstract No.
GSF-K-				
90	NTIS (US Sales Only), PC A05/MF A01	DE83751047	MN -11	8:54923
HDL-TM-				
83-6	*See* AD-A-130141/5			8:54757
HEDL-				
7387	NTIS, PC A02/MF A01	DE83018209	MN -80	8:53929
HEDL-TME-				
83-11	NTIS, PC A03/MF A01	DE83017990	STD -79	8:53897
HMI-B-				
388	NTIS (US Sales Only), PC A10/MF A01	DE83751055	MN -80	8:53983
IAE-				
3442/ 15	NTIS (US Sales Only), PC A02/MF A01	DE83703094	MN -32	8:53936
3450/ 5	NTIS (US Sales Only), PC A02/MF A01	DE83703011	MN -80	8:53898
3451/ 5	NTIS (US Sales Only), PC A03/MF A01	DE83703035	MN -78	8:53937
3455/ 3	NTIS (US Sales Only), PC A03/MF A01	DE83703089	MN -2	8:53911
3458/ 5	NTIS (US Sales Only), PC A03/MF A01	DE83703012	MN -80	8:53915
3491/ 4	NTIS (US Sales Only), PC A02/MF A01	DE83703013	MN -80	8:53916
3582/ 5	NTIS (US Sales Only), PC A03/MF A01	DE83703567	MN -80	8:53917
IAEA-R-				
2137/ F	NTIS (US Sales Only), PC A02/MF A01	DE83703434	MN -11	8:54953
2226-F	NTIS (US Sales Only), PC A05/MF A01	DE83703539	MN -34D	8:55202
2561-F	NTIS (US Sales Only), PC A02/MF A01	DE83703561	MN -48	8:55042
2571-F	NTIS (US Sales Only), PC A03/MF A01	DE83703565	MN -48	8:54973
2616-F	NTIS (US Sales Only), PC A03/MF A01	DE83703560	MN -48	8:55043
IAEA-SM-				
263/ 17	Vienna; IAEA (1982).			8:54997
IAEA-TC-				
389/ 6-2	NTIS (US Sales Only), PC A02/MF A01	DE83703025	MN -80	8:53878
389/ 6-3	NTIS (US Sales Only), PC A03/MF A01	DE83703030	MN -80	8:53930
389/ 6-4	NTIS (US Sales Only), PC A02/MF A01	DE83703031	MN -80	8:53879
389/ 6-5	NTIS (US Sales Only), PC A02/MF A01	DE83703032	MN -80	8:53880
389/ 6-6	NTIS (US Sales Only), PC A02/MF A01	DE83703033	MN -80	8:53881
389/ 6-8	NTIS (US Sales Only), PC A03/MF A01	DE83703034	MN -80	8:53882
389/ 6-10	NTIS (US Sales Only), PC A02/MF A01	DE83703018	MN -80	8:53883
389/ 6-11	NTIS (US Sales Only), PC A02/MF A01	DE83703019	MN -80	8:53884
389/ 6-14	NTIS (US Sales Only), PC A02/MF A01	DE83703021	MN -80	8:53885
389/ 6-15	NTIS (US Sales Only), PC A02/MF A01	DE83703022	MN -80	8:53886
389/ 6-16	NTIS (US Sales Only), PC A02/MF A01	DE83703023	MN -80	8:53887
389/ 6-17	NTIS (US Sales Only), PC A03/MF A01	DE83703024	MN -80	8:53888
389/ 6-21	NTIS (US Sales Only), PC A02/MF A01	DE83703026	MN -80	8:53889
389/ 6-24	NTIS (US Sales Only), PC A02/MF A01	DE83703027	MN -80	8:53938
389/ 6-25	NTIS (US Sales Only), PC A02/MF A01	DE83703028	MN -80	8:53894
389/ 6-26	NTIS (US Sales Only), PC A02/MF A01	DE83703029	MN -80	8:53931
IAEA-TECDOC-				
269	NTIS (US Sales Only), PC A09/MF A01	DE83703562	MN -23	8:54983
IC-				
82/ 100	NTIS (US Sales Only), PC A04/MF A01	DE83703545	MN -34C	8:55203
82/ 134	NTIS (US Sales Only), PC A02/MF A01	DE83703540	MN -34A	8:55121
82/ 137	NTIS (US Sales Only), PC A02/MF A01	DE83703548	MN -34C	8:55167
82/ 149	NTIS (US Sales Only), PC A02/MF A01	DE83703546	MN -34C	8:55204
82/ 201	NTIS (US Sales Only), PC A02/MF A01	DE83703435	MN -34B	8:55101
ICR-				
87-81-3	NTIS (US Sales Only), PC A03/MF A01	DE83702974	MN -34B	8:55147
IFVE-OEA-				
82-141	NTIS (US Sales Only), PC A02/MF A01	DE83703063	MN -37	8:54679
IFVE-OEF-				
82-49	NTIS (US Sales Only), PC A02/MF A01	DE83703065	MN -37	8:54680
82-58	NTIS (US Sales Only), PC A02/MF A01	DE83703066	MN -37	8:54681
82-149	NTIS (US Sales Only), PC A02/MF A01	DE83703064	MN -37	8:54682
IFVE-OI-				
81-125	NTIS (US Sales Only), PC A02/MF A01	DE83702977	MN -28	8:54562
81-126	NTIS (US Sales Only), PC A02/MF A01	DE83702978	MN -28	8:54563
81-173	NTIS (US Sales Only), PC A02/MF A01	DE83702979	MN -28	8:54577
82-160	NTIS (US Sales Only), PC A02/MF A01	DE83702980	MN -28	8:54578
IFVE-ONF-				
82-97	NTIS (US Sales Only), PC A02/MF A01	DE83703067	MN -37	8:54683
IFVE-OP-				
82-117	NTIS (US Sales Only), PC A02/MF A01	DE83703068	MN -37	8:54684
82-130	NTIS (US Sales Only), PC A02/MF A01	DE83702981	MN -28	8:54579
IFVE-ORI-				
82-75	NTIS (US Sales Only), PC A02/MF A01	DE83702982	MN -28	8:54606
IFVE-OTF-				
82-125	NTIS (US Sales Only), PC A02/MF A01	DE83703543	MN -34D	8:55148
INDC-				
37/ U	NTIS (US Sales Only), PC A05/MF A01	DE83703553	MN -34C	8:55161
INDC(CCP)-				
184/ L	NTIS (US Sales Only), PC A02/MF A01	DE83703549	MN -34C	8:55199
INDC(NDS)-				
133/ NE	NTIS (US Sales Only), PC A05/MF A01	DE83703551	MN -34C	8:55162
138/ GE	NTIS (US Sales Only), PC A04/MF A01	DE83703552	MN -34C	8:55195
INDC(SEC)-				
82/ UN	NTIS (US Sales Only), PC A05/MF A01	DE83703574	MN -2	8:55163
INP-				
1106/ PL	NTIS (US Sales Only), PC A05/MF A01	DE83702950	MN -34C	8:55168

Report No.	*Availability*	*Order No.*	*Distribution Category*	*Abstract No.*
INR-				
1900/ 24/ PL/ A	Energetics and Atomic Energy Information Centre, Warsaw, Poland		ND -32	8:54580
INS-				
403	NTIS (US Sales Only), PC A03/MF A01	DE83702951	MN -34C	8:55165
442	NTIS (US Sales Only), PC A02/MF A01	DE83703069	MN -37	8:54685
INS-J-				
163	NTIS (US Sales Only), PC A03/MF A01	DE83703070	MN -37	8:54686
INS-NUMA-				
30	NTIS (US Sales Only), PC A05/MF A01	DE83702983	MN -28	8:54581
32	NTIS (US Sales Only), PC A02/MF A01	DE83702984	MN -28	8:54582
INS-TH-				
141	NTIS (US Sales Only), PC A03/MF A01	DE83703095	MN -32	8:54608
143	NTIS (US Sales Only), PC A02/MF A01	DE83702985	MN -28	8:54609
144	NTIS (US Sales Only), PC A02/MF A01	DE83702986	MN -28	8:54610
INS-TL-				
140	NTIS (US Sales Only), PC A03/MF A01	DE83703071	MN -37	8:54687
141	NTIS (US Sales Only), PC A02/MF A01	DE83703072	MN -37	8:54688
142	NTIS (US Sales Only), PC A02/MF A01	DE83702987	MN -28	8:54689
IPPJ-DT-				
89	NTIS (US Sales Only), PC A05/MF A01	DE83703073	MN -37	8:54690
IS-M-				
420	NTIS, PC A02/MF A01	DE83017694	MN -25	8:54273
426	NTIS MF A01; 2	DE83017674	MN -90	8:53387
427	NTIS, PC A02/MF A01	DE83017676	MN -4	8:54293
429	NTIS, PC A02/MF A01; 1	DE83017681	MN -25	8:54256
433	NTIS, PC A02/MF A01; 1	DE83017683	MN -38	8:54531
434	NTIS, PC A02/MF A01	DE83017692	MN -32	8:55223
435	NTIS, PC A02/MF A01	DE83017696	MN -34	8:55218
439	NTIS, PC A02/MF A01; 1	DE83017691	MN -38	8:54368
440	NTIS, PC A02/MF A01	DE83017685	MN -25	8:54532
444	NTIS, PC A02/MF A01; 1	DE83018082	MN -25	8:54533
445	NTIS, PC A03/MF A01	DE83018081	MN -25	8:54534
446	NTIS, PC A02/MF A01; 1	DE83018080	MN -34	8:54535
449	NTIS, PC AMF/A01 02	DE83018076	MN -25	8:54536
450	NTIS, PC A02/MF A01; 1	DE83018077	MN -25	8:54274
452	NTIS, PC A02/MF A01	DE83018078	MN -4	8:54294
453	NTIS, PC A02/MF A01; 1	DE83018079	MN -34	8:54275
454	NTIS, PC A02/MF A01; 1	DE83018075	MN -34	8:54276
455	NTIS, PC A02/MF A01	DE83018074	MN -25	8:54215
456	NTIS, PC A02/MF A01	DE83018073	MN -25	8:54537
457	NTIS, PC A02/MF A01	DE83018090	MN -25	8:54277
459	NTIS, PC A02/MF A01	DE83018091	MN -25	8:54216
ISH-				
17	Available from Bundesgesundheitsamt, Neuherberg (Germany, F.R.)			8:55044
ITEF-				
64(1982)	NTIS (US Sales Only), PC A02/MF A01	DE83703083	MN -37	8:54691
69(1982)	NTIS (US Sales Only), PC A02/MF A01	DE83703038	MN -77	8:53965
94(1982)	NTIS (US Sales Only), PC A02/MF A01	DE83703096	MN -32	8:53939
104(1982)	NTIS (US Sales Only), PC A02/MF A01	DE83703074	MN -37	8:54692
123(1982)	NTIS (US Sales Only), PC A03/MF A01	DE83703554	MN -34C	8:55183
IWGGCR-				
5	NTIS (US Sales Only), PC A02/MF A01	DE83703568	MN -77	8:53890
JINR-				
9-82-357	NTIS (US Sales Only), PC A02/MF A01	DE83702989	MN -28	8:54583
9-82-515	NTIS (US Sales Only), PC A02/MF A01	DE83702990	MN -28	8:54584
9-82-556	NTIS (US Sales Only), PC A02/MF A01	DE83702991	MN -28	8:54611
9-82-623	NTIS (US Sales Only), PC A02/MF A01	DE83702992	MN -28	8:54612
10-82-351	NTIS (US Sales Only), PC A02/MF A01	DE83703084	MN -37	8:54693
10-82-490	NTIS (US Sales Only), PC A02/MF A01	DE83703075	MN -37	8:54694
13-82-90	NTIS (US Sales Only), PC A02/MF A01	DE83703077	MN -37	8:54695
13-82-318	NTIS (US Sales Only), PC A02/MF A01	DE83703085	MN -37	8:54696
13-82-452	NTIS (US Sales Only), PC A02/MF A01	DE83703076	MN -37	8:54697
13-82-587	NTIS (US Sales Only), PC A02/MF A01	DE83702988	MN -28	8:54585
13-82-763	NTIS (US Sales Only), PC A02/MF A01	DE83703570	MN -37	8:54698
13-82-764	NTIS (US Sales Only), PC A02/MF A01	DE83703571	MN -37	8:54699
16-82-444	NTIS (US Sales Only), PC A02/MF A01	DE83703078	MN -37	8:54700
18-82-558	NTIS (US Sales Only), PC A02/MF A01	DE83703559	MN -25	8:54217
E-1-82-285	NTIS (US Sales Only), PC A02/MF A01	DE83702952	MN -34C	8:55184
E-1-82-286	NTIS (US Sales Only), PC A02/MF A01	DE83702953	MN -34C	8:55185
E-1-82-287	NTIS (US Sales Only), PC A02/MF A01	DE83702954	MN -34C	8:55149
E-1-82-352	NTIS (US Sales Only), PC A02/MF A01	DE83702955	MN -34C	8:55169
E-1-82-377	NTIS (US Sales Only), PC A02/MF A01	DE83703555	MN -34C	8:55170
E-1-82-517	NTIS (US Sales Only), PC A02/MF A01	DE83702956	MN -34C	8:55171
E-2-82-671	NTIS (US Sales Only), PC A02/MF A01	DE83703533	MN -34D	8:55158
E-2-82-681	NTIS (US Sales Only), PC A02/MF A01	DE83703534	MN -34D	8:55159
E-2-82-705	NTIS (US Sales Only), PC A02/MF A01	DE83703535	MN -34D	8:55224
E-2-82-745	NTIS (US Sales Only), PC A02/MF A01	DE83703536	MN -34D	8:55150
E-10-82-136	NTIS (US Sales Only), PC A02/MF A01	DE83703079	MN -37	8:54701
E-13-82-421	NTIS (US Sales Only), PC A02/MF A01	DE83703080	MN -37	8:54702
E-13-82-639	NTIS (US Sales Only), PC A02/MF A01	DE83703573	MN -37	8:54761
R-1-81-773	NTIS (US Sales Only), PC A02/MF A01	DE83702957	MN -34C	8:55172
R-1-82-393	NTIS (US Sales Only), PC A02/MF A01	DE83702958	MN -34C	8:55173
R-1-82-534	NTIS (US Sales Only), PC A02/MF A01	DE83702959	MN -34C	8:55174

Report No.	Availability	Order No.	Distribution Category	Abstract No.
R-3-82-224	NTIS (US Sales Only), PC A02/MF A01	DE83702961	MN -34C	8:55186
R-3-82-303	NTIS (US Sales Only), PC A02/MF A01	DE83702962	MN -34C	8:55178
R-3-82-411	NTIS (US Sales Only), PC A02/MF A01	DE83702963	MN -34C	8:55180
R-3-82-436	NTIS (US Sales Only), PC A02/MF A01	DE83702964	MN -34C	8:55187
R-10-82-304	NTIS (US Sales Only), PC A02/MF A01	DE83703097	MN -32	8:55115
R-10-82-597	NTIS (US Sales Only), PC A02/MF A01	DE83703098	MN -32	8:54703
R-11-82-459	NTIS (US Sales Only), PC A02/MF A01	DE83703099	MN -32	8:55336
R-13-82-533	NTIS (US Sales Only), PC A02/MF A01	DE83703060	MN -80	8:53940
R-13-82-547	NTIS (US Sales Only), PC A02/MF A01	DE83703081	MN -37	8:54704
R-15-82-173	NTIS (US Sales Only), PC A02/MF A01	DE83702960	MN -34C	8:55188
JINR-R-				
1-82-353	NTIS (US Sales Only), PC A02/MF A01	DE83703544	MN -34D	8:55139
2-82-721	NTIS (US Sales Only), PC A02/MF A01	DE83703537	MN -34D	8:55225
5-82-723	NTIS (US Sales Only), PC A02/MF A01	DE83703538	MN -34D	8:55226
9-82-383	NTIS (US Sales Only), PC A02/MF A01	DE83702993	MN -28	8:54613
9-82-502	NTIS (US Sales Only), PC A02/MF A01	DE83702994	MN -28	8:54586
9-82-504	NTIS (US Sales Only), PC A02/MF A01	DE83702995	MN -28	8:54587
15-82-706	NTIS (US Sales Only), PC A02/MF A01	DE83703572	MN -37	8:54705
JPL-PUB-				
81-66-Vol.1	NTIS, PC A09/MF A01; 1	DE83902813	MN -37	8:54759
81-66-Vol.2	NTIS, PC A15/MF A01; 1	DE83902814	MN -37	8:54760
Juel-				
1809	NTIS (US Sales Only), PC A05/MF A01	DE83751054	MN -78	8:53918
1814	NTIS (US Sales Only), PC A05/MF A01	DE83751050	MN -25	8:54218
Juel-Spez-				
161	NTIS (US Sales Only), PC A03/MF A01	DE83751052	MN -41	8:54924
KEK-				
81-6	NTIS (US Sales Only), PC A04/MF A01	DE83703004	MN -28	8:54474
81-7	NTIS (US Sales Only), PC A02/MF A01	DE83703005	MN -28	8:54643
81-10	NTIS (US Sales Only), PC A02/MF A01	DE83702996	MN -28	8:54644
81-11	NTIS (US Sales Only), PC A03/MF A01	DE83702997	MN -28	8:54588
81-13	NTIS (US Sales Only), PC A10/MF A01	DE83702998	MN -28	8:54616
81-14	NTIS (US Sales Only), PC A02/MF A01	DE83702999	MN -28	8:54589
81-15	NTIS (US Sales Only), PC A02/MF A01	DE83703000	MN -28	8:54590
81-17	NTIS (US Sales Only), PC A04/MF A01	DE83703001	MN -28	8:54617
81-19	NTIS (US Sales Only), PC A02/MF A01	DE83703002	MN -28	8:54591
81-20	NTIS (US Sales Only), PC A03/MF A01	DE83703003	MN -28	8:54618
KFK-tr-				
685	NTIS (US Sales Only), PC A03/MF A01	DE83781139	MN -21	8:55323
KFKI-				
1982-111	NTIS (US Sales Only), PC A02/MF A01	DE83703448	MN -80	8:53941
1982-114	NTIS (US Sales Only), PC A02/MF A01	DE83703443	MN -41	8:54925
1983-09	NTIS (US Sales Only), PC A02/MF A01	DE83703449	MN -80	8:53942
KFTI-				
82-10	NTIS (US Sales Only), PC A03/MF A01	DE83703006	MN -28	8:54565
KIYI-				
81-27	NTIS (US Sales Only), PC A03/MF A01	DE83703100	MN -32	8:55337
81-41	NTIS (US Sales Only), PC A02/MF A01	DE83703086	MN -37	8:54762
KMSF-U-				
1307	*See* AD-A-128623/6			8:54500
KURRI-TR-				
218	NTIS (US Sales Only), PC A03/MF A01	DE83703007	MN -28	8:53732
LA-				
9770-MS	NTIS, PC A05/MF A01	DE84000123	STD -32	8:55338
LA-tr-				
83-14	NTIS, PC A08/MF A01; 1	DE83017528	MN -34	8:54529
LA-UR-				
83-2291	NTIS, PC A02/MF A01	DE83017606	MN -38	8:54763
83-2319	NTIS, PC A02/MF A01	DE83017303	MN -34A	8:55116
83-2351	NTIS, PC A02/MF A01	DE83017320	MN -38	8:54475
83-2355	NTIS, PC A02/MF A01	DE83017321	MN -34C	8:55189
83-2368	NTIS, PC A02/MF A01	DE83017326	MN -34B	8:55094
83-2399	NTIS, PC A02/MF A01	DE83017233	MN -37	8:54538
83-2400	NTIS, PC A02/MF A01	DE83017234	MN -37	8:54539
83-2411	NTIS, PC A02/MF A01; 1	DE83017235	MN -34	8:54510
83-2443	NTIS, PC A02/MF A01	DE83017290	MN -34	8:54511
83-2486	NTIS, PC A02/MF A01; 1	DE83017297	MN -34B	8:55095
LAPP-TH-				
74	*See* DESY-83-012	DE83751058	MN -34D	8:55146
LBL-				
13883-Rev.	NTIS, PC A03/MF A01	DE83017524	MN -95d	8:54139
14178	NTIS, PC A02/MF A01	DE83017518	MN -25	8:54219
14588	NTIS, PC A06/MF A01	DE83017838	MN -25	8:54257
15122	NTIS, PC A02/MF A01	DE83017535	MN -28	8:54619
15180	NTIS, PC A11/MF A01	DE83017678	MN -48	8:54968
15646-Rev.	NTIS, PC A02/MF A01	DE83014858	MN -37	8:54764
15751	NTIS, PC A02/MF A01; 1	DE83017767	MN -38	8:54522
15869	NTIS, PC A07/MF A01	DE83017520	MN -90a	8:53371
15918-Rev.	NTIS, PC A02/MF A01	DE83015531	MN -38	8:54765
15973	NTIS, PC A09/MF A01; 1	DE83015006	STD -37	8:54706
15991	NTIS, PC A02/MF A01; 1	DE83017521	MN -28	8:54620
16003	NTIS, PC A02/MF A01	DE83017519	MN -28	8:54621
16031	NTIS, PC A19/MF A01; 1	DE83016323	STD -25	8:54766
16045	NTIS, PC A10/MF A01; 1	DE83017903	MN -70	8:53649
16295	NTIS, PC A02/MF A01	DE83017742	MN -34D	8:55152

Report No.	Availability	Order No.	Distribution Category	Abstract No.
16448	NTIS, PC A02/MF A01; 1	DE83017522	MN -4	8:53372
16451	NTIS, PC A02/MF A01; 1	DE83017740	MN -34D	8:55194
16459	NTIS, PC A02/MF A01	DE83017750	MN -25	8:54308
16470	NTIS, PC A02/MF A01; 1	DE83017749	MN -38	8:54477
16514	NTIS, PC A02/MF A01	DE83017744	MN -94cc	8:54049
LLB-RA-				
1981-82	NTIS (US Sales Only), PC A06/MF A01	DE83703541	MN -34A	8:54268
MASGP-				
82-024	*See* PB-83-228650			8:53441
MDC-H-				
0731	*See* AD-A-129842/1			8:55089
MESA-IR-				
1002	NTIS, PC A02/MF A01	DE83902979	MN -41	8:53426
1009	NTIS, PC A02/MF A01	DE83902990	MN -41	8:55074
MLM-				
3074(OP)	NTIS, PC A02/MF A01	DE83016628	MN -70B	8:53650
3083(TR)	NTIS, PC A02/MF A01; 1	DE83015099	MN -32	8:55231
3084(TR)	NTIS, PC A02/MF A01; 1	DE83015092	MN -32	8:55232
3089	NTIS, PC A02/MF A01	DE83018067	STD -38	8:54236
3094(OP)	NTIS, PC A02/MF A01	DE83016988	MN -70	8:53651
MS-				
5.8-1974	NTIS (US Sales Only), PC A02/MF A01	DE83703563	MN -41	8:55211
MSHA/IR-				
1126	NTIS, PC A11/MF A01; 1	DE83902955	MN -41	8:55075
1130	NTIS, PC A02/MF A01	DE83903010	MN -41	8:55076
1131	NTIS, PC A02/MF A01	DE83903011	MN -41	8:53468
1141	NTIS, PC A05/MF A01	DE83902793	MN -41	8:55077
1142	NTIS, PC A11/MF A01; 1	DE83903023	MN -41	8:55078
MTB-				
149	NTIS (US Sales Only), PC A02/MF A01	DE83703009	MN -25	8:54540
152	NTIS (US Sales Only), PC A02/MF A01	DE83703010	MN -25	8:54541
153	NTIS (US Sales Only), PC A02/MF A01	DE83703036	MN -78	8:53875
MTR-				
80W00022	NTIS, PC A06; 3	DE83017761	ND -58b	8:53778
NASA/CR-				
168204	*See* DOE/NASA/3255-1(7-81)	DE83017708	STD -90g	8:54116
NASA-TM-				
83454	*See* DOE/NASA/20320-48	DE83018232	STD -60	8:53847
83472	*See* DOE/NASA/20320-50	DE83017796	MN -60	8:53848
NBL-				
307	NTIS, PC A04/MF A01	DE83018116	MN -37	8:54731
NBS-TN-				
1178	*See* PB-83-218636			8:53968
NBSIR-				
83-2647	*See* PB-83-202531			8:55166
83-2725	*See* PB-83-223982			8:55190
NCEI-				
0059	NTIS, PC A05/MF A01; 1	DE83017783	MN -13	8:54070
NCEL-TN-				
1654	*See* AD-A-128772/1			8:53420
1658	*See* AD-A-128748/1			8:54127
1659	*See* AD-A-128764/8			8:54157
NIIAR-				
19(534)	NTIS (US Sales Only), PC A02/MF A01	DE83703101	MN -32	8:53967
42(495)	NTIS (US Sales Only), PC A02/MF A01	DE83703556	MN -34C	8:55196
59(512)	NTIS (US Sales Only), PC A02/MF A01	DE83703102	MN -32	8:54542
NIIEFA-P-B-				
0527	NTIS (US Sales Only), PC A02/MF A01	DE83703008	MN -28	8:54622
NIRS-AR-				
21	NTIS (US Sales Only), PC A11/MF A01	DE83703103	MN -2	8:55324
22	NTIS (US Sales Only), PC A12/MF A01	DE83703104	MN -2	8:55325
NIRS-RSD-				
50	NTIS (US Sales Only), PC A03/MF A01	DE83781082	MN -11	8:54898
NMERDI-				
2-67-2238(1)	Univ. of New Mexico, 117 Richmond Dr., N.E., Albuquerque, NM 87106		MN -66i	8:53840
NOAA-TM-ERL-SEL-				
65	*See* PB-83-186163			8:55096
NP-				
3770395	NTIS (US Sales Only), PC A07/MF A01; 1	DE83770395	MN -88	8:53401
3770396	NTIS (US Sales Only), PC A03/MF A01; 1	DE83770396	MN -97b	8:54102
3770397	NTIS (US Sales Only), PC A06/MF A01; 1	DE83770397	MN -95	8:54166
3770398	NTIS (US Sales Only), PC A06/MF A01; 1	DE83770398	MN -11	8:54063
3770399	NTIS (US Sales Only), PC A11/MF A01; 1	DE83770399	MN -95d	8:54140
3770400	NTIS (US Sales Only), PC A10/MF A01	DE83770400	MN -11	8:54064
3770401	NTIS (US Sales Only), PC A06/MF A01	DE83770401	MN -96	8:54199
3770402	NTIS (US Sales Only), PC A03/MF A01	DE83770402	MN -13	8:54071
3770403	NTIS (US Sales Only), PC A06/MF A01	DE83770403	MN -95	8:54111
3770404	NTIS (US Sales Only), PC A03/MF A01	DE83770404	MN -69	8:54065
3770405	NTIS (US Sales Only), PC A05/MF A01	DE83770405	MN -13	8:54066
3770406	NTIS (US Sales Only), PC A03/MF A01	DE83770406	MN -11	8:54067
3770407	NTIS (US Sales Only), PC A05/MF A01; 1	DE83770407	MN -13	8:55326
3770408	NTIS (US Sales Only), PC A09/MF A01; 1	DE83770408	MN -96	8:54200
3770409	NTIS (US Sales Only), PC A11/MF A01; 1	DE83770409	MN -95d	8:54167
3900904	NTIS (US Sales Only), PC A02/MF A01; 1	DE83900904	MN -21	8:55293

Report No.	Availability	Order No.	Distribution Category	Abstract No.
3902702	NTIS, PC A05/MF A01	DE83902702	MN -88	8:53402
3902703	NTIS, PC A07/MF A01	DE83902703	MN -88	8:53403
3902791	NTIS, PC A06/MF A01; 1	DE83902791	MN -88	8:53404
3902951	NTIS, PC A04/MF A01; 1	DE83902951	MN -88	8:53405
3903013	NTIS, PC A03/MF A01	DE83903013	MN -88	8:53406
3903014	NTIS, PC A04/MF A01; 1	DE83903014	MN -88	8:53407
3903015	NTIS, PC A05/MF A01; 1	DE83903015	MN -88	8:53408
3903016	NTIS, PC A03/MF A01; 1	DE83903016	MN -88	8:53409
3910802	NTIS, PC A03/MF A01	DE83910802	MN -11	8:55079
3910818	NTIS, PC A25/MF A01; 1	DE83910818	MN -92	8:53440
NRL-MR-				
4896	*See* AD-A-129774/6			8:55257
4950	*See* AD-A-128242/5			8:54571
5053	*See* AD-A-126937/2			8:54569
5061	*See* AD-A-126864/8			8:54568
5078	*See* AD-A-128254/0			8:55254
5080	*See* AD-A-128922/2			8:55234
5092	*See* AD-A-129546/8			8:54870
5093	*See* AD-A-129723/3			8:55256
5104	*See* AD-A-129465/1			8:55235
5105	*See* AD-A-129758/9			8:55103
5118	*See* AD-A-129785/2			8:55258
5184	NTIS, PC A04/MF A01; 1	DE83018114	MN -21	8:55294
NUREG-				
0420-Suppl.4	NTIS, PC A04/MF A01	DE84900071	MN -78	8:54025
0540-Vol.5-No.6	NTIS, PC A25/MF A01; 1 - GPO	DE83910831	MN -80	8:53907
0580-Vol.12-No.8	NTIS, PC A04/MF A01 - GPO	DE83903090	MN -80	8:53908
0827-FINAL	NTIS, PC A23/MF A01; 1 - GPO $10.00	DE83902899	MN -78	8:54026
0925-Final	NTIS, PC A12/MF A01; 1 - GPO $7.50	DE83902786	MN -11	8:54961
1003	NTIS, PC A03/MF A01; 1 - GPO	DE83910868	MN -78	8:53876
NUREG/CR-				
0200-Vols.1-2-3-Bk.5	NTIS, PC A17/MF A01 - GPO $8.50	DE83017853	MN -15	8:53720
0200-Vols.1-2-3-Bk.4	NTIS PC E12/MF A01 - GPO $9.00	DE83017843	MN -15	8:53721
1246-Vol.4	NTIS PC E07/MF A01 - GPO	DE83017842	MN -15	8:53718
2238-Vol.20	NTIS, PC A14/MF A01 - GPO	DE83018255	MN -78	8:54027
2482-Vol.4	NTIS, PC A09/MF A01; 1 - GPO $6.00	DE83018273	MN -70	8:53652
2631	NTIS, PC A03/MF A01 - GPO	DE84000053	MN -78	8:54028
2850-Vol.2	NTIS, PC A06/MF A01 - GPO $5.50	DE83017609	MN -80	8:53952
3091-Vol.2	NTIS, PC A07/MF A01 - GPO $5.00	DE83017468	MN -70	8:53653
3179	NTIS, PC A06/MF A01; 1 - GPO	DE83017794	MN -78	8:54029
3204	NTIS, PC A03/MF A01 - GPO	DE83018197	MN -70A	8:53654
3234	NTIS, PC A04/MF A01; 1 - GPO	DE83017028	MN -78	8:54030
3264	NTIS, PC A13/MF A01 - GPO $7.50	DE83910829	MN -16	8:53719
3269	NTIS, PC A03/MF A01 - GPO	DE83018244	MN -79p	8:54031
3345	NTIS, PC A06/MF A01; 1 - GPO	DE83016943	MN -80	8:54032
3359-Vol.2	NTIS, PC A02/MF A01 - GPO	DE83018253	MN -79d	8:54033
3371-Vol.1	NTIS, PC A12/MF A01; 1 - GPO $6.50	DE83910862	MN -80	8:53944
3371-Vol.2	NTIS, PC A15/MF A01 - GPO $8.00	DE83910813	MN -78	8:53945
3397	NTIS, PC A08/MF A01; 1 - GPO	DE83018208	MN -70B	8:53655
3399	NTIS, PC A03/MF A01; 1 - GPO $3.75	DE83910891	MN -41	8:55212
3404	NTIS, PC A05/MF A01; 1 - GPO $5.00	DE83017847	MN -11	8:54926
3419	NTIS PC E04/MF A01 - GPO	DE83017463	MN -80	8:54034
3427-Vol.1	NTIS, PC A04/MF A01 - GPO $4.25	DE83910816	MN -70	8:53656
3473	NTIS, PC A14/MF A01; 1 - GPO $7.50	DE83910814	MN -70	8:53657
NYSERDA-				
83-8-Vol.1	New York State Energy Research and Development Authority, Two Rockefeller Plaza, Albany, NY 12223		MN -90	8:53346
83-8-Vol.2	New York State Energy Research and Development Authority, Two Rockefeller Plaza, Albany, NY 12223		MN -90	8:53347
83-14	New York State Energy Research and Development Authority, Two Rockefeller Plaza, Albany, NY 12223		MN -90i	8:53418
OAEP-				
92	NTIS (US Sales Only), PC A03/MF A01	DE83702965	MN -4	8:54295
93	NTIS (US Sales Only), PC A03/MF A01	DE83702966	MN -4	8:54296
94	NTIS (US Sales Only), PC A03/MF A01	DE83702967	MN -4	8:54297
96	NTIS (US Sales Only), PC A03/MF A01	DE83702968	MN -4	8:54298
OEFZS-				
4200	NTIS (US Sales Only), PC A02/MF A01	DE83703433	MN -51	8:55083
ONRL-R-				
3-83	*See* AD-A-129442/0			8:54502
ONWI-				
27	NTIS, PC A19/MF A01; 1	DE83018271	MN -70	8:53689
92	NTIS, PC A19/MF A01; 1	DE84000508	MN -70	8:53658
195	NTIS (US Sales Only), PC A05/MF A01; 1	DE84000509	MN -70	8:53659
197	NTIS, PC A04/MF A01; 1	DE83018071	MN -70	8:53660
284	NTIS, PC A11/MF A01; 1	DE83018267	MN -70	8:53661
363	NTIS, PC A03/MF A01	DE83018265	MN -70	8:53662
365	NTIS MF A01; 2	DE83017860	MN -70	8:53663
417	NTIS, PC A07/MF A01; 1	DE83017789	MN -70	8:53664
474	NTIS, PC A04/MF A01	DE83018230	MN -70	8:53670
478	NTIS, PC A06/MF A01; 1	DE83014558	MN -70	8:53671
486	NTIS, PC A09/MF A01; 1	DE83017788	MN -70	8:53672
494	NTIS, PC A05/MF A01; 1	DE84000527	MN -70	8:53673
ORC-				
82-10	*See* PB-83-193805			8:54103

Report No.	Availability	Order No.	Distribution Category	Abstract No.
ORNL-				
3979	*See* NUREG/CR-3397	DE83018208	MN -70B	8:53655
ORNL/NUREG/CSD-				
2/ R2-Bk.4	*See* NUREG/CR-0200-Vols.1-2-3-Bk.4	DE83017843	MN -15	8:53721
2/ R2-Bk.5	*See* NUREG/CR-0200-Vols.1-2-3-Bk.5	DE83017853	MN -15	8:53720
ORNL/TM-				
8227	NTIS, PC A06/MF A01	DE83018301	STD -90d	8:53348
8419	NTIS, PC A03/MF A01	DE84000541	MN -71	8:53581
8635	*See* NUREG/CR-3179	DE83017794	MN -78	8:54029
8690	*See* NUREG/CR-3204	DE83018197	MN -70A	8:53654
8717	NTIS, PC A04/MF A01; 1	DE83017992	STD -70B	8:53674
OTA-				
3910803	NTIS, PC A05/MF A01	DE83910803	MN -25	8:54237
PATENTS-FR-	(French: Service d'Edition et de Vente des Publications Officielles, 39 rue de la Convention, Paris 15, France, 2.50 F per copy, plus 1.80 F postage for 1 copy)			
2,509,444/ A/				8:53793
2,509,445/ A/				8:53814
2,509,446/ A/				8:53824
2,509,843/ A/				8:53823
2,510,242/ A/				8:53813
2,511,130/ A/				8:53821
2,511,131/ A/				8:53822
2,511,487/ A/				8:53820
PATENTS-US-	(US: Commissioner of Patents, Washington, D.C. 20231, USA, $1.00 per copy. Government Patent Applications available from NTIS)			
4,387,025				8:53463
4,389,568				8:53475
4,390,008				8:53812
4,390,062				8:53435
4,390,567				8:53724
A 6-390,730		DE83018087	MN -63	8:53787
A 6-414,192		DE83018088	MN -4	8:54304
A 6-414,193		DE83018089	MN -60	8:53853
A 6-414,543		DE83018095	MN -20	8:55322
A 6-414,544		DE83018096	MN -11	8:54948
A 6-414,545		DE83018097	MN -38	8:54530
A 6-414,745		DE83018098	MN -37	8:54780
A 6-415,117		DE83018099	MN -23	8:53934
A 6-415,515		DE83018100	MN -41	8:54889
A 6-415,616		DE83018101	MN -15	8:53722
A 6-415,941		DE83018102	MN -92a	8:53436
A 6-415,946		DE83018103	MN -37	8:54486
A 6-416,409		DE83018104	MN -25	8:54285
A 6-418,150		DE83018105	MN -38	8:54783
A 6-420,051		DE83018106	MN -90c	8:53363
A 6-420,052		DE83018107	MN -93	8:54052
A 6-420,053		DE83018108	MN -93	8:54123
A 6-420,054		DE83018066	MN -25	8:54244
A 6-420,070		DE83018061	MN -79	8:53905
A 6-420,432		DE83018062	MN -10	8:54243
A 6-420,433		DE83018060	MN -37	8:54629
A 6-422,510		DE83018059	MN -25	8:54284
A 6-422,511		DE83018058	MN -48	8:54977
A 6-422,512		DE83018055	MN -38	8:54485
A 6-422,515		DE83018057	MN -37	8:54779
A 6-422,516		DE83018056	MN -95d	8:54146
A 6-422,519		DE83018051	MN -4	8:53688
A 6-422,796		DE83018053	MN -38	8:54484
A 6-424,111		DE83018054	MN -93	8:54122
A 6-424,112		DE83018049	MN -94c	8:54051
A 6-425,139		DE83018050	MN -38	8:54482
A 6-425,140		DE83018048	MN -37	8:54778
A 6-425,141		DE83018047	MN -25	8:53687
A 6-425,142		DE83018044	MN -38	8:54483
A 6-425,144		DE83018045	MN -37	8:54777
A 6-426,362		DE83018043	MN -59	8:53827
A 6-426,363		DE83018046	MN -37	8:54628
A 6-426,364		DE83018040	MN -38	8:54369
A 6-426,369		DE83018041	MN -37	8:53828
A 6-426,370		DE83018038	MN -62	8:53826
A 6-426,435		DE83018039	MN -38	8:54516
A 6-426,446		DE83018042	MN -37	8:53932
A 6-426,448		DE83018035	MN -38	8:54544
A 6-429,740		DE83018034	MN -38	8:54044
A 6-429,920		DE83018037	MN -37	8:54775
A 6-429,921		DE83018033	MN -38	8:54515
A 6-429,922		DE83018032	MN -79m	8:53950
A 6-429,923		DE83018024	MN -62d	8:53825
A 6-429,924		DE83018022	MN -38	8:53726
A 6-430,105		DE83018025	MN -38	8:54481
A 6-430,578		DE83018023	MN -37	8:54776
A 6-430,579		DE83018026	MN -37	8:54556
A 6-433,299		DE83018018	MN -38	8:54774

Report No.	Availability	Order No.	Distribution Category	Abstract No.
A 6-434,021		DE83018017	MN -90c	8:53362
A 6-435,157		DE83018020	MN -37	8:54773
A 6-435,181		DE83018019	MN -28	8:54567
A 6-435,791		DE83018021	MN -20a	8:55321
A 6-435,795		DE83018013	MN -38	8:54750
A 6-435,796		DE83018014	MN -21	8:53725
A 6-435,797		DE83018015	MN -38	8:54543
A 6-436,557		DE83018016	MN -38	8:54480
A 6-436,558		DE83018012	MN -20a	8:55253
A 6-437,081		DE83018008	MN -37	8:55119
A 6-437,082		DE83018011	MN -47	8:53472
A 6-437,400		DE83018010	MN -79e	8:53904
A 6-437,404		DE83018009	MN -38	8:54782
A 6-437,782		DE83018007	MN -90a	8:53382
A 6-437,783		DE83018004	MN -37	8:54772
A 6-437,784		DE83018006	MN -63c	8:53786
A 6-438,126		DE83018003	MN -4	8:53723
A 6-452,360		DE83018002	MN -37	8:54918
PB-				
83-158444	NTIS, PC A06/MF A01			8:54168
83-162396	NTIS, PC A11/MF A01			8:54141
83-162750	NTIS PC E01/MF A01			8:53753
83-163253	NTIS, PC A05/MF A01			8:53754
83-164517	NTIS, PC A02/MF A01			8:54169
83-165340	NTIS, PC A02/MF A01			8:53802
83-165936	NTIS, PC A02/MF A01			8:53849
83-167783	NTIS, PC A15/MF A01			8:54187
83-170191	NTIS PC E04/MF E04			8:54170
83-170597	NTIS, PC A04/MF A01			8:53763
83-170936	NTIS PC E05/MF E05			8:53803
83-171009	NTIS, PC A05/MF A01			8:53804
83-173047	NTIS, PC A08/MF A01			8:53850
83-173062	NTIS PC E04/MF E04			8:53805
83-173070	NTIS PC E04/MF E04			8:53806
83-173096	NTIS PC E09/MF E09			8:53757
83-173146	NTIS PC E06/MF E06			8:53807
83-174136	NTIS, PC A13/MF A01			8:54081
83-174144	NTIS, PC A11/MF A01			8:54082
83-174185	NTIS, PC A06/MF A01			8:53760
83-180547	NTIS, PC A14/MF A01			8:54171
83-186163	NTIS, PC A03/MF A01			8:55096
83-188656	NTIS, PC A09/MF A01			8:53447
83-188672	NTIS, PC A06/MF A01			8:54121
83-191569	NTIS, PC A03/MF A01			8:53395
83-191577	NTIS, PC A03/MF A01			8:53396
83-193284	NTIS, PC A11/MF A01			8:54942
83-193805	NTIS, PC A03/MF A01			8:54103
83-194019	NTIS, PC A05/MF A01			8:54882
83-194381	NTIS, PC A03/MF A01			8:54201
83-194829	NTIS, PC A25/MF A01			8:54152
83-195826	NTIS, PC A10/MF A01			8:54883
83-195834	NTIS, PC A07/MF A01			8:54884
83-195958	NTIS, PC A13/MF A01			8:54885
83-196469	NTIS, PC A06/MF A01			8:54068
83-196477	NTIS, PC A04/MF A01			8:54943
83-196766	NTIS, PC A05/MF A01			8:54732
83-197707	NTIS, PC A04/MF A01			8:54172
83-197822	NTIS, PC A09/MF A01			8:54188
83-197921	NTIS, PC A99/MF E06			8:54958
83-198895	NTIS PC E05/MF E05			8:54238
83-199190	NTIS, PC A11/MF A01			8:54960
83-200857	NTIS, PC A07/MF A01			8:53397
83-200865	NTIS, PC A04/MF A01			8:53398
83-200873	NTIS, PC A06/MF A01			8:54060
83-202531	NTIS, PC A02/MF A01			8:55166
83-204065	NTIS, PC A13/MF A01			8:54061
83-205443	NTIS, PC A03/MF A01			8:53738
83-206961	NTIS, PC A03/MF A01			8:54910
83-207001	NTIS, PC A05/MF A01			8:54955
83-207407	NTIS, PC A05/MF A01			8:53860
83-207480	NTIS, PC A04/MF A01			8:53388
83-207639	NTIS, PC A22/MF A01			8:54561
83-207670	NTIS, PC A09/MF A01			8:54956
83-209056	NTIS, PC A06/MF A01			8:54944
83-209064	NTIS, PC A04/MF A01			8:54957
83-209155	NTIS, PC A05/MF A01			8:53863
83-210633	NTIS, PC A03/MF A01			8:54904
83-210872	NTIS PC E03/MF E03			8:55295
83-212043	NTIS, PC A06/MF A01			8:54901
83-212050	NTIS, PC A16/MF A01			8:54902
83-213843	NTIS, PC A04/MF A01			8:55344
83-214734	NTIS, PC A99/MF E03			8:53389
83-216481	NTIS, PC A03/MF A01			8:53390
83-217331	NTIS PC E05/MF E01			8:54886
83-217786	NTIS, PC A15/MF A01			8:55071

Report No.	Availability	Order No.	Distribution Category	Abstract No.
83-218339	NTIS, PC A03/MF A01			8:54112
83-218396	NTIS, PC A06/MF A01			8:54069
83-218636	NTIS, PC A11/MF A01			8:53968
83-221713	NTIS, PC A05/MF A01			8:53779
83-221804	NTIS, PC A10/MF A01			8:54153
83-221812	Source tape is in ASCII character set. Character set restricts preparation to 9 track, one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products if you have questions. Price includes documentation, PB83-221804			8:54154
83-223982	NTIS, PC A05/MF A01			8:55190
83-224378	NTIS, PC A05/MF A01			8:53780
83-224394	NTIS, PC A06/MF A01			8:54959
83-224733	NTIS PC E04/MF E04			8:53739
83-224931	NTIS PC E04/MF E04			8:53421
83-225102	NTIS, PC A04/MF A01			8:54908
83-225144	NTIS, PC A05/MF A01			8:53781
83-225375	NTIS, PC A02/MF A01			8:55072
83-225938	NTIS, PC A11/MF A01			8:54905
83-226480	NTIS, PC A04/MF A01			8:55073
83-226928	NTIS, PC A05/MF A01			8:54299
83-227223	NTIS, PC A11/MF A01			8:53808
83-227397	NTIS, PC A03/MF A01			8:54300
83-227678	NTIS PC E04/MF E01			8:53809
83-227801	NTIS PC E03/MF E01			8:53810
83-228650	NTIS, PC A02/MF A01			8:53441
83-228676	NTIS, PC A11/MF A01			8:53798
83-228726	NTIS PC E08/MF E01			8:53747
83-228809	NTIS, PC A04/MF A01			8:54974
83-229013	NTIS, PC A03/MF A01			8:54876
83-229666	NTIS PC E05/MF E01			8:53423
83-229781	NTIS PC E04/MF E04			8:54189
83-231324	NTIS, PC A05/MF A01			8:54887
83-231365	NTIS, PC A03/MF A01			8:54202
83-231373	NTIS, PC A03/MF A01			8:54203
83-231571	NTIS PC E04/MF E01			8:53864
83-231951	NTIS PC E04/MF E01			8:53865
83-232157	NTIS, PC A03/MF A01			8:54975
83-232199	NTIS, PC A03/MF A01			8:54173
83-232728	NTIS, PC A04/MF A01			8:54142
83-232959	NTIS PC E03/MF E01			8:54155
83-234088	NTIS, PC A04/MF A01			8:53442
83-234708	NTIS, PC A04/MF A01			8:54976
83-235556	NTIS, PC A04/MF A01			8:53427
83-238683	NTIS, PC A17/MF A01			8:53391
83-238691	NTIS, PC A25/MF A01			8:53392
83-239533	NTIS, PC A10/MF A01			8:53349
83-903603	*See* DOE/TIC/EGC-83/3		ND -13	8:55343
PINSTECH/HP-				
28	NTIS (US Sales Only), PC A02/MF A01	DE83702975	MN -23	8:54927
PINSTECH/HPD-				
101	NTIS (US Sales Only), PC A03/MF A01	DE83702976	MN -41	8:55213
PINSTECH/NCD-				
104	NTIS (US Sales Only), PC A03/MF A01	DE83702972	MN -86	8:53471
PNC-G-				
033-82-01(1)	NTIS (US Sales Only), PC A02/MF A01	DE83703040	MN -79	8:53969
033-82-01(2)	NTIS (US Sales Only), PC A02/MF A01	DE83703041	MN -79	8:53970
033-82-01(3)	NTIS (US Sales Only), PC A02/MF A01	DE83703042	MN -79	8:53971
033-82-01(4)	NTIS (US Sales Only), PC A02/MF A01	DE83703043	MN -79	8:53972
033-82-01(5)	NTIS (US Sales Only), PC A02/MF A01	DE83703044	MN -79	8:53973
033-82-01(6)	NTIS (US Sales Only), PC A02/MF A01	DE83703045	MN -79	8:53974
033-82-01(7)	NTIS (US Sales Only), PC A02/MF A01	DE83703046	MN -79	8:53975
PNC-J-				
260-82-01	NTIS (US Sales Only), PC A03/MF A01	DE83703061	MN -80	8:53976
PNC-N-				
241-81-11(3)	NTIS (US Sales Only), PC A02/MF A01	DE83703047	MN -79	8:53900
241-81-11(4)	NTIS (US Sales Only), PC A02/MF A01	DE83703048	MN -79	8:53901
241-81-11(5)	NTIS (US Sales Only), PC A02/MF A01	DE83703049	MN -79	8:53902
241-81-11(6)	NTIS (US Sales Only), PC A02/MF A01	DE83703050	MN -79	8:53977
930-80-02	NTIS (US Sales Only), PC A04/MF A01	DE83703051	MN -79	8:53978
930-80-03	NTIS (US Sales Only), PC A03/MF A01	DE83703052	MN -79	8:53979
930-80-04	NTIS (US Sales Only), PC A03/MF A01	DE83703053	MN -79	8:53980
930-81-01	NTIS (US Sales Only), PC A04/MF A01	DE83703054	MN -79	8:53981
941-81-114	NTIS (US Sales Only), PC A02/MF A01	DE83703055	MN -79	8:53946
941-81-115	NTIS (US Sales Only), PC A02/MF A01	DE83703056	MN -79	8:53947
941-81-116	NTIS (US Sales Only), PC A02/MF A01	DE83703057	MN -79	8:53948
PNCT-				
841-81-56	NTIS (US Sales Only), PC A02/MF A01	DE83703082	MN -37	8:54733
841-81-57	NTIS (US Sales Only), PC A02/MF A01	DE83703090	MN -16	8:54734
PNL-				
4221-Vol.2	*See* NUREG/CR-2850-Vol.2	DE83017609	MN -80	8:53952
4333	NTIS, PC A07/MF A01	DE83017997	MN -70	8:53675
4581	NTIS, PC A04/MF A01	DE83017745	MN -11	8:54062
4663	NTIS, PC A17/MF A01; 1	DE83018222	MN -60	8:53851
4738	NTIS, PC A03/MF A01; 1	DE83018228	MN -70	8:53676

Report No.	Availability	Order No.	Distribution Category	Abstract No.
4759	NTIS, PC A03/MF A01	DE83017881	MN -23	8:53731
4763	NTIS, PC A07/MF A01; 1	DE83017737	MN -95d	8:54143
4782	*See* NUREG/CR-3404	DE83017847	MN -11	8:54926
4803	NTIS, PC A06/MF A01	DE83018220	MN -95f	8:54174
4844	NTIS, PC A02/MF A01	DE83018221	MN -70B	8:53677
PNL-SA-				
9530-Pt.2	NTIS, PC A03/MF A01	DE83008518	MN -12	8:54523
10382	NTIS, PC A02/MF A01	DE83016924	MN -38	8:55327
10781	NTIS, PC A02/MF A01; 1	DE83002725	MN -78	8:54035
10870	NTIS, PC A02/MF A01	DE83003469	MN -11	8:54911
11167	NTIS, PC A03/MF A01	DE83017870	MN -32	8:55227
11282	NTIS, PC A03/MF A01	DE83017871	MN -48	8:54982
11354	NTIS, PC A02/MF A01	DE83016784	MN -95f	8:54175
11371	NTIS, PC A02/MF A01	DE83017889	MN -90i	8:53428
11502	NTIS, PC A02/MF A01	DE83018298	MN -95d	8:54144
11509	NTIS, PC A02/MF A01; 1	DE83017868	MN -95d	8:54145
11568	NTIS, PC A02/MF A01	DE83017805	MN -70B	8:53678
11579	NTIS, PC A02/MF A01	DE83018286	MN -70	8:53679
PPPL-				
2020	NTIS, PC A04/MF A01	DE83017985	STD -20g	8:55245
2021	NTIS, PC A04/MF A01	DE83017984	STD -20f	8:55246
PRI-				
60	*See* AD-A-129004/8			8:54501
PTB-FMRB-				
95	NTIS (US Sales Only), PC A03/MF A01	DE83751053	MN -80	8:53982
R-				
3-83	*See* AD-A-129571/6			8:54506
4-82	*See* AD-A-130036/7			8:54508
76-952161-5(Vol.2) (App.)	*See* CONS/NSF/42-1(Vol.2)	DE83017640	STD -95f	8:54042
RAD-				
82-213-012-36-VOL-1	*See* PB-83-238683			8:53391
82-213-012-36-VOL-2	*See* PB-83-238691			8:53392
RHO-BW-ST-				
19-P	NTIS, PC A11/MF A01; 1	DE83018233	STD -70	8:53680
RHO-PB-SR-				
10-B-SUM-JUN-83	NTIS, PC A03/MF A01; 1	DE83016171	MN -2	8:53474
10-B-WM-JUN-83	NTIS, PC A06/MF A01; 1	DE83016173	MN -70	8:53681
RISLEY-Trans-				
4352	NTIS (US Sales Only), PC A02; 3	DE83902216	ND -78	8:53877
RISO-M-				
2273	NTIS (US Sales Only), PC A02/MF A01	DE83703564	MN -41	8:54345
RMCS-R-				
78005	NTIS (US Sales Only), PC A03/MF A01	DE83702969	MN -4	8:54301
80001	NTIS (US Sales Only), PC A06/MF A01	DE83702970	MN -4	8:54302
SAI-				
84-166-WA	*See* AD-A-128795/2			8:55346
84-170-WA	*See* AD-A-128408/2			8:54195
254-83-416-LJ	*See* AD-A-129004/8			8:54501
1583-368LJ	*See* NUREG/CR-3264	DE83910829	MN -16	8:53719
SAND-				
79-2247/ 4	*See* NUREG/CR-1246-Vol.4	DE83017842	MN -15	8:53718
81-1529-20	*See* NUREG/CR-2238-Vol.20	DE83018255	MN -78	8:54027
82-1980	*See* NUREG/CR-3269	DE83018244	MN -79p	8:54031
82-1998C	NTIS, PC A02/MF A01; 1	DE83013464	MN -71	8:53713
82-2726	*See* NUREG/CR-2631	DE84000053	MN -78	8:54028
82-2778	NTIS, PC A02/MF A01	DE83017652	STD -71	8:53582
83-0194C	NTIS, PC A02/MF A01	DE83017485	MN -25	8:54281
83-0263	NTIS MF A01; 2	DE83017785	STD -63	8:54768
83-0518	NTIS, PC A04/MF A01	DE83017995	MN -92a	8:53434
83-0524C	NTIS, PC A02/MF A01; 1	DE83017560	MN -34A	8:54566
83-0538	*See* NUREG/CR-3234	DE83017028	MN -78	8:54030
83-0564C	NTIS, PC A02/MF A01; 1	DE83017793	MN -21	8:55296
83-0575C	NTIS MF A01; 2	DE83017824	MN -21	8:55297
83-0609C	NTIS, PC A02/MF A01; 1	DE83017791	MN -21	8:55298
83-0611C	NTIS, PC A02/MF A01; 1	DE83017792	MN -21	8:55299
83-0612C	NTIS, PC A02/MF A01; 1	DE83017822	MN -21	8:55300
83-0617C	NTIS, PC A02/MF A01; 1	DE83017784	MN -21	8:55301
83-0620C	NTIS, PC A02/MF A01; 1	DE83017800	MN -21	8:55302
83-0665C	NTIS, PC A02/MF A01; 1	DE83017484	MN -38	8:54552
83-0795C	NTIS MF A01; 2	DE83017820	MN -78	8:54036
83-0950C	NTIS, PC A02/MF A01	DE83017790	MN -20c	8:55303
83-0959C	NTIS, PC A03/MF A01; 1	DE83017482	MN -64	8:54769
83-1148C	NTIS, PC A03/MF A01	DE83013770	MN -25	8:55081
83-1265	NTIS, PC A02/MF A01; 1	DE83018235	MN -32	8:55339
83-1273C	NTIS, PC A02/MF A01; 1	DE83017353	MN -25	8:54239
83-1283	NTIS, PC A05/MF A01; 1	DE83017883	STD -63	8:53761
83-1316C	NTIS, PC A02/MF A01; 1	DE83018264	MN -21	8:55304
83-1844C	NTIS, PC A02/MF A01	DE83017158	MN -34	8:54524
83-1902C	NTIS, PC A02/MF A01	DE83017823	MN -38	8:55228
83-1945C	NTIS, PC A03/MF A01	DE83017826	MN -32	8:55340
83-1992C	NTIS, PC A02/MF A01; 1	DE83018263	MN -21	8:55305
83-7029	NTIS, PC A09/MF A01; 1	DE83017994	MN -38	8:53852
83-7102	NTIS MF A01; 2	DE83018068	STD -66c	8:53836
83-7110	NTIS, PC A02/MF A01; 1	DE83017811	MN -90d	8:53350

Report No.	Availability	Order No.	Distribution Category	Abstract No.
83-7122	NTIS, PC A03/MF A01	DE83017403	MN -94ca	8:54050
83-8025	NTIS, PC A02/MF A01	DE83018288	MN -37	8:54770
83-8029	NTIS, PC A02/MF A01	DE83018113	MN -32	8:55341
SCIENTIFIC-				
1	*See* AD-A-130116/7			8:55099
SERI/TP-				
254-2027	NTIS, PC A02/MF A01; 1	DE83011989	STD -59c	8:53758
611-1241	NTIS, PC A02/MF A01; 1	DE83003711	MN -63	8:53782
SERI/TR-				
215-1824	NTIS, PC A03/MF A01; 1	DE83011998	STD -59c	8:53759
231-1887	NTIS, PC A03/MF A01	DE83011994	STD -61a	8:53744
253-1868	NTIS, PC A03/MF A01	DE83011999	STD -62a	8:53792
SERP-E-				
112	*See* IFVE-OEF-82-49	DE83703065	MN -37	8:54680
143	*See* IFVE-ONF-82-97	DE83703067	MN -37	8:54683
SGP-TR-				
40	NTIS, PC A17/MF A01	DE83012133	MN -66	8:53837
SLAC-PUB-				
2946	NTIS, PC A05/MF A01; 1	DE83007024	MN -28	8:54593
3099	NTIS, PC A02/MF A01	DE83010776	MN -34D	8:55141
3113	NTIS, PC A02/MF A01	DE83014898	MN -28	8:55306
3187	NTIS, PC A02/MF A01	DE83018219	MN -34D	8:55142
SP-				
60-10-112	*See* AD-A-129600/3			8:55220
SSI-				
8144-12	*See* AD-A-129880/1			8:54373
8145-12	*See* AD-A-128969/3			8:55347
SSS-R-				
83-5978	*See* AD-A-127120/4			8:54869
ST-				
105/ 83	*See* OEFZS-4200	DE83703433	MN -51	8:55083
STF-				
15-A83020	*See* PB-83-224931			8:53421
25-A82009	*See* PB-83-224733			8:53739
TKK-F-A-				
491	*See* PB-83-227678			8:53809
498	*See* PB-83-227801			8:53810
TR-				
19	*See* AD-A-128876/0			8:55219
26	*See* AD-A-126999/2			8:54266
146	*See* AD-A-129907/2			8:54351
147	*See* AD-A-129908/0			8:54352
148	*See* AD-A-129909/8			8:54353
149	*See* AD-A-129910/6			8:54354
150	*See* AD-A-129911/4			8:54355
151	*See* AD-A-129912/2			8:54356
152	*See* AD-A-129913/0			8:54357
153	*See* AD-A-129914/8			8:54358
154	*See* AD-A-129915/5			8:54359
155	*See* AD-A-129916/3			8:54360
0083(3606) -1	*See* AD-A-129527/8			8:54505
0083(3930-01) -1	*See* AD-A-127075/0			8:54494
0083(3930-01) -2	*See* AD-A-126611/3			8:54492
0083(3940-03) -1	*See* AD-A-128715/0			8:54784
TR-EE-				
83-25	NTIS, PC A06/MF A01; 1	DE83017013	MN -97	8:53855
Trans-WH-				
548	NTIS (US Sales Only), PC A02/MF A01; 1	DE83902908	MN -78	8:54040
TRRL-SUPPLEMENTARY-				
744	*See* PB-83-232959			8:54155
TRW-				
36116-6006-UT-00	*See* AD-A-130135/7			8:55100
TU-Inf-				
05-01-81	NTIS (US Sales Only), PC A02/MF A01	DE83703456	MN -37	8:54735
05-09-80	NTIS (US Sales Only), PC A02/MF A01	DE83703550	MN -34C	8:55175
05-13-80	NTIS (US Sales Only), PC A02/MF A01	DE83703457	MN -37	8:54736
05-14-80	NTIS (US Sales Only), PC A02/MF A01	DE83703458	MN -37	8:54737
05-15-80	NTIS (US Sales Only), PC A02/MF A01	DE83703444	MN -41	8:55214
05-17-80	NTIS (US Sales Only), PC A02/MF A01	DE83703459	MN -37	8:54738
05-18-80	NTIS (US Sales Only), PC A02/MF A01	DE83703460	MN -37	8:54739
05-19-80	NTIS (US Sales Only), PC A02/MF A01	DE83703461	MN -37	8:54740
05-20-80	NTIS (US Sales Only), PC A02/MF A01	DE83703462	MN -37	8:54741
05-21-80	NTIS (US Sales Only), PC A02/MF A01	DE83703463	MN -37	8:54742
05-27-80	NTIS (US Sales Only), PC A02/MF A01	DE83703464	MN -37	8:54743
05-28-80	NTIS (US Sales Only), PC A02/MF A01	DE83703465	MN -37	8:54744
05-29-80	NTIS (US Sales Only), PC A02/MF A01	DE83703466	MN -37	8:54745
05-37-80	NTIS (US Sales Only), PC A02/MF A01	DE83703445	MN -28	8:54623
TVA/OP/EDT-				
82/ 54	NTIS, PC A03/MF A01; 1	DE83910827	MN -92	8:53446
83/ 12	NTIS, PC A12/MF A01; 1	DE83910852	MN -90	8:53861
TVA/OP/TSEC-				
82/ 1	NTIS, PC A02/MF A01	DE83910817	MN -97	8:54104
UAH-				
345	NTIS MF A01; 2	DE83015946	STD -98E	8:54105

Report No.	Availability	Order No.	Distribution Category	Abstract No.
UCID-				
19719	*See* NUREG/CR-3345	DE83016943	MN -80	8:54032
19720	NTIS, PC A02/MF A01	DE83017905	MN -97b	8:53909
19837	NTIS, PC A04/MF A01	DE83017706	MN -20	8:55307
19866	NTIS, PC A02/MF A01	DE83017828	MN -11	8:54877
19877-Pt.1	NTIS, PC A03/MF A01	DE83017832	MN -38	8:54553
19887	NTIS, PC A03/MF A01	DE84000359	MN -38	8:54525
19890	NTIS, PC A02/MF A01	DE83017988	MN -21	8:54240
UCRL-				
15548	NTIS, PC A02/MF A01	DE84000172	MN -90a	8:53351
53287	NTIS, PC A05/MF A01; 1	DE83018231	MN -11	8:54037
53336	NTIS, PC A03/MF A01	DE83018069	STD -90i	8:53393
53438	NTIS, PC A05/MF A01	DE83017882	MN -38	8:55122
88209	NTIS, PC A02/MF A01	DE83017835	MN -21	8:55308
88667	NTIS, PC A02/MF A01	DE83017370	MN -21	8:55309
88671	NTIS, PC A02/MF A01	DE83018005	MN -38	8:54554
88811	NTIS, PC A02/MF A01; 1	DE83017368	MN -20b	8:55310
88916	NTIS, PC A03/MF A01	DE83017836	MN -20	8:55311
88964	NTIS, PC A02/MF A01	DE83017367	MN -20	8:55312
89227	NTIS, PC A02/MF A01	DE83017617	MN -28	8:54594
89286	NTIS, PC A02/MF A01	DE83016790	MN -20a	8:55247
89296	NTIS, PC A03/MF A01	DE83017293	MN -20d	8:55313
89297	NTIS, PC A02/MF A01; 1	DE83017196	MN -20a	8:55248
89511	NTIS, PC A02/MF A01	DE83017841	MN -70	8:53727
89738	NTIS, PC A02/MF A01	DE83017629	MN -38	8:54478
89745	NTIS, PC A03/MF A01; 1	DE83017374	MN -20g	8:55314
89750	NTIS, PC A02/MF A01	DE83017366	MN -34	8:55315
89754	NTIS, PC A02/MF A01	DE83017607	MN -32	8:55342
89756	NTIS, PC A02/MF A01	DE83017473	MN -38	8:54479
89767	NTIS, PC A02/MF A01	DE83017840	MN -20g	8:55249
89768	NTIS, PC A02/MF A01	DE83017372	MN -20g	8:55250
89769	NTIS, PC A02/MF A01	DE83017365	MN -20g	8:55316
89771	NTIS, PC A02/MF A01; 1	DE83017369	MN -20a	8:55251
89776	NTIS, PC A02/MF A01	DE83017839	MN -38	8:54771
UCRL-Trans-				
11876	NTIS, PC A02/MF A01; 1	DE83015279	MN -37	8:54753
UILU-ENG-				
82-2554	*See* AD-A-128534/5			8:54499
UJV-				
5856-T	NTIS (US Sales Only), PC A03/MF A01	DE83703058	MN -79	8:53903
6216-CH	NTIS (US Sales Only), PC A02/MF A01	DE83703088	MN -70	8:53682
6232-T	NTIS (US Sales Only), PC A06/MF A01	DE83703059	MN -79	8:53922
6256-CH	NTIS (US Sales Only), PC A02/MF A01	DE83702971	MN -4	8:54346
UNI-				
436	NTIS MF A01/MF $13.00; 2	DE83018203	MN -80	8:53984
USGS-OFR-				
78-926	NTIS, PC A03/MF A01; 1	DE83902682	MN -51	8:53466
78-929	NTIS, PC A02/MF A01; 1	DE83903083	MN -66	8:53833
USGS-PP-				
1044-I	GPO		MN -66a	8:53829
USGS/WRD/WRI-				
83-014	*See* PB-83-218396			8:54069
USGS/WRI-				
81-74	*See* PB-83-218396			8:54069
UT/CES-WP-				
6	NTIS, PC A02/MF A01	DE83910889	MN -59c	8:53811
UTNL-R-				
0121	*See* PNC-J-260-82-01	DE83703061	MN -80	8:53976
UTRC/R-				
83-925499	*See* AD-A-129832/2			8:55104
WES-TR-E-				
83-5	*See* AD-A-126771/5			8:53756
83-6	*See* AD-A-126770/7			8:53755
WIPP-DOE-				
176	NTIS MF A01; 2	DE83017998	STD -41	8:55046
Y/DD-				
317	NTIS, PC A02/MF A01	DE83017552	MN -41	8:55215
Y/DK-				
357	NTIS, PC A02/MF A01	DE83017867	MN -4	8:54303
Y/DU-				
301	NTIS, PC A02/MF A01; 1	DE83017845	MN -25	8:54204
ZfI-Mitt-				
55	NTIS (US Sales Only), PC A05/MF A01	DE83781080	MN -4	8:53728
60	NTIS (US Sales Only), PC A04/MF A01	DE83781079	MN -4	8:53729
ZfK-				
488	NTIS (US Sales Only), PC A12/MF A01	DE83703475	MN -2	8:55164
489	NTIS (US Sales Only), PC A12/MF A01	DE83703476	MN -2	8:54205
490	NTIS (US Sales Only), PC A06/MF A01	DE83703446	MN -28	8:54624

ORDER NUMBER CORRELATION

This correlation list is provided for those organizations where document storage is alphanumeric by report number and request may be received by order number. For other information about a document (abstract number, distribution category, availability, and price), please refer to the Report Number Index.

Order No.	*Report No.*
DE82021364	ANL-Trans—1204
DE83002725	PNL-SA—10781
DE83003469	PNL-SA—10870
DE83003711	SERI/TP—611-1241
DE83003910	DOE/ER/01198—1394
DE83004598	BNL—32183
DE83006355	DOE/ET/17091—1356
DE83006356	DOE/ET/17091—1355
DE83006537	DOE/PC/30089—T1
DE83007024	SLAC-PUB—2946
DE83007509	CONF-830109—3
DE83008416	CONF-7909271—1
DE83008518	PNL-SA—9530-Pt.2
DE83008702	CONF-821005—
DE83008949	CONF-810602—
DE83009572	ANL-HEP-CP—82-24
DE83010776	SLAC-PUB—3099
DE83011007	DOE/ET/10324—T55
DE83011391	CONF-830492—1
DE83011989	SERI/TP—254-2027
DE83011994	SERI/TR—231-1887
DE83011998	SERI/TR—215-1824
DE83011999	SERI/TR—253-1868
DE83012064	DOE/NBM—3012064
DE83012066	DOE/NBM—3012066
DE83012133	SGP-TR—40
DE83012181	DOE/ID/12147—T1-Rev.
DE83012390	CONF-830528—Summ.
DE83012805	CONF-8006216—
DE83013279	BNL—33116
DE83013464	SAND—82-1998C
DE83013770	SAND—83-1148C
DE83014054	BNL—33651
DE83014055	BNL—33649
DE83014383	CONF-830101—
DE83014558	ONWI—478
DE83014621	CONF-8208148—
DE83014858	LBL—15646-Rev.
DE83014898	SLAC-PUB—3113
DE83014930	CONF-830653—
DE83015006	LBL—15973
DE83015062	DOE/CS/20531—T8
DE83015092	MLM—3084(TR)
DE83015099	MLM—3083(TR)
DE83015279	UCRL-Trans—11876
DE83015428	DOE/MC/14731—1439
DE83015531	LBL—15918-Rev.
DE83015620	CONF-8208157—1
DE83015629	DOE/CS/30264—T1
DE83015766	DOE/NBM—3015766
DE83015796	DOE/METC—83-52
DE83015830	DOE/ET/12047—T10
DE83015869	DOE/MC/14129—1463
DE83015895	GCRA—83-009
DE83015946	UAH—345
DE83015991	CONF-830649—3
DE83016152	DOE/CS/15024—T1
DE83016156	DOE/FE/55014—T5
DE83016171	RHO-PB-SR—10-B-SUM-JUN-83
DE83016173	RHO-PB-SR—10-B-WM-JUN-83
DE83016193	DOE/CE/15094—T1
DE83016248	DOE/ET/11041—T1
DE83016323	LBL—16031
DE83016342	DOE/MC/11251—1442
DE83016388	DOE/ER/01023—6
DE83016437	DOE/ET/23074—T2
DE83016453	ENICO—1116-8-83
DE83016569	DOE/JPL/956133—83-1
DE83016628	MLM—3074(OP)
DE83016680	DOE/CS/40402—16
DE83016681	DOE/ET/14146—T1
DE83016736	DOE/ER/10684—T1
DE83016738	DOE/PC/50793—T3
DE83016784	PNL-SA—11354
DE83016790	UCRL—89286
DE83016809	CONF-8206214—
DE83016869	DOE/MC/19210—1453
DE83016923	CONF-801144—7
DE83016924	PNL-SA—10382
DE83016943	NUREG/CR—3345
DE83016950	DOE/CS/35147—T1
DE83016968	GA-A—17157
DE83016978	DOE/ET/14880—T4
DE83016984	DOE/RA/50259—T5
DE83016985	DOE/RA/50259—T3
DE83016988	MLM—3094(OP)
DE83016993	DOE/JPL/956254—1
DE83017013	TR-EE—83-25
DE83017018	DOE/RA/50259—T4
DE83017019	DOE/RA/50259—T6
DE83017028	NUREG/CR—3234
DE83017033	DOE/RA/50259—T2
DE83017110	DOE/ER/70038—5
DE83017123	DOE/ER/03077—179
DE83017133	CONF-8308115—1
DE83017138	CONF-830841—14
DE83017139	CONF-821155—11
DE83017147	DOE/PC/30013—10
DE83017158	SAND—83-1844C
DE83017177	CONF-8305127—1
DE83017178	CONF-830406—104
DE83017179	CONF-8305128—1
DE83017182	CONF-820180—1
DE83017192	CONF-8308106—4
DE83017193	DOE/ET/20587—T1
DE83017196	UCRL—89297
DE83017201	BNL-tr—1009
DE83017205	CONF-8308112—2
DE83017206	CONF-8308112—1
DE83017209	DOE/ER/10762—T1
DE83017211	CONF-8206219—1-Draft
DE83017212	CONF-810188—1-Draft
DE83017214	CONF-801144—9
DE83017215	CONF-830798—1
DE83017219	CONF-8308110—1
DE83017220	CONF-8308111—1
DE83017225	CONF-8204141—1
DE83017233	LA-UR—83-2399
DE83017234	LA-UR—83-2400
DE83017235	LA-UR—83-2411
DE83017244	CONF-830389—1
DE83017250	CONF-8106311—2-Draft
DE83017251	CONF-8308107—1
DE83017254	CONF-801144—10
DE83017256	CONF-810214—15-DRAFT
DE83017272	CONF-8308108—1
DE83017274	CONF-8308109—1
DE83017278	CONF-830942—5
DE83017286	CONF-801144—8
DE83017287	DOE/ER/10178—2
DE83017290	LA-UR—83-2443
DE83017293	UCRL—89296
DE83017297	LA-UR—83-2486
DE83017303	LA-UR—83-2319
DE83017320	LA-UR—83-2351
DE83017321	LA-UR—83-2355
DE83017326	LA-UR—83-2368
DE83017331	DOE/ET/15295—T1
DE83017343	BNL—33597
DE83017345	BNL—33472
DE83017351	BNL—33487
DE83017352	BNL—33493
DE83017353	SAND—83-1273C
DE83017354	DOE/CA/10015—T1
DE83017365	UCRL—89769
DE83017366	UCRL—89750
DE83017367	UCRL—88964
DE83017368	UCRL—88811
DE83017369	UCRL—89771
DE83017370	UCRL—88667
DE83017372	UCRL—89768
DE83017374	UCRL—89745
DE83017376	DOE/ER/10000—T1
DE83017377	DOE/ER/03065—T3
DE83017382	CONF-821155—12
DE83017395	DOE/EV/03861—48
DE83017401	DOE/ER/05489—2
DE83017403	SAND—83-7122
DE83017420	DOE/PC/30209—T2
DE83017432	DOE/SF/10842—T1
DE83017433	DOE/ER/70185—T1
DE83017435	DOE/PC/30209—T4
DE83017441	DOE/ET/29071—T5
DE83017442	DOE/PC/30209—T3
DE83017443	DOE/PC/30209—T1
DE83017444	DOE/AD/06185—T1
DE83017447	DOE/ER/10903—4
DE83017449	DOE/R5/10307—1
DE83017452	DOE/RA/50146—T1
DE83017453	DOE/RL/74032—7
DE83017454	DOE/RL/74032—8
DE83017455	DOE/ER/10688—T1
DE83017463	NUREG/CR—3419
DE83017465	DOE/ER/04987—4
DE83017467	DOE/ER/53104—6
DE83017468	NUREG/CR—3091-Vol.2
DE83017469	DOE/SF/10842—T2
DE83017470	GA-A—17012
DE83017471	DOE/ER/60100—T1
DE83017473	UCRL—89756
DE83017479	DOE/ET/29196—T1
DE83017481	DOE/PC/50786—T1
DE83017482	SAND—83-0959C
DE83017484	SAND—83-0665C
DE83017485	SAND—83-0194C
DE83017488	DOE/ID/01606—T1
DE83017494	DP-MS—82-55
DE83017505	DOE/PC/50784—T1
DE83017508	DP-MS—82-85
DE83017518	LBL—14178
DE83017519	LBL—16003
DE83017520	LBL—15869

Order No.	Report No.
DE83017521	LBL—15991
DE83017522	LBL—16448
DE83017524	LBL—13883-Rev.
DE83017525	GJBX—28(83)
DE83017526	GJBX—37(83)-Vol.2
DE83017528	LA-tr—83-14
DE83017530	ANL/CNSV—41
DE83017533	DOE/ET/10815—84
DE83017534	DOE/FC/10492—T1
DE83017535	LBL—15122
DE83017539	DOE/CE—0045
DE83017542	DOE/EP—0100
DE83017544	DOE/PC/40784—T2
DE83017551	DOE/CS/24355—T1
DE83017552	Y/DD—317
DE83017553	CONF-830390—1
DE83017558	DOE/SF/00515—T21
DE83017559	DOE/RA/50239—T3-Rev.1
DE83017560	SAND—83-0524C
DE83017563	DOE/MC/19077—T3
DE83017564	DOE/ER/10830—2
DE83017565	DOE/AL/10752—24
DE83017566	DOE/EIA—0130(83/08)
DE83017576	DLCS—5000283
DE83017577	BNL-NUREG—33530
DE83017578	BNL—33532
DE83017579	BNL—33533
DE83017580	BNL—33534
DE83017581	BNL—33535
DE83017582	BNL—33536
DE83017583	BNL—33539
DE83017584	BNL—33561
DE83017586	BNL-NUREG—33574
DE83017589	DOE/CS/54045—1-Vol.1-Summ.
DE83017606	LA-UR—83-2291
DE83017607	UCRL—89754
DE83017609	NUREG/CR—2850-Vol.2
DE83017617	UCRL—89227
DE83017620	CONF-830911—Absts.
DE83017622	BNL-tr—1006
DE83017625	BNL—33518
DE83017626	BNL—33554
DE83017629	UCRL—89738
DE83017634	DOE/LC/10678—T1
DE83017635	DOE/EIA—0191(82)
DE83017640	CONS/NSF/42—1(Vol.2)
DE83017652	SAND—82-2778
DE83017674	IS-M—426
DE83017676	IS-M—427
DE83017677	DOE/ER/04426—6
DE83017678	LBL—15180
DE83017680	DOE/ID/01740—T1
DE83017681	IS-M—429
DE83017683	IS-M—433
DE83017685	IS-M—440
DE83017687	DOE/PC/40789—T7
DE83017688	GA-A—17018
DE83017689	GA-A—17016
DE83017690	BNL—51686
DE83017691	IS-M—439
DE83017692	IS-M—434
DE83017694	IS-M—420
DE83017696	IS-M—435
DE83017702	DOE/CE/15126—T2
DE83017706	UCID—19837
DE83017708	DOE/NASA/3255—1(7-81)
DE83017723	BNL-tr—1005
DE83017727	DOE/BP—166-Vol.1
DE83017728	DOE/BP—166-Vol.2
DE83017732	ANL/FE—83-13
DE83017736	ANL/FE—83-14
DE83017737	PNL—4763
DE83017740	LBL—16451
DE83017742	LBL—16295
DE83017743	DOE/ET/15614—T4
DE83017744	LBL—16514
DE83017745	PNL—4581
DE83017749	LBL—16470
DE83017750	LBL—16459
DE83017751	BNL—32362
DE83017755	DOE/ER/05016—5
DE83017758	DOE/DP/40173—T1
DE83017759	BNL—33592
DE83017760	DOE/PC/30222—T3
DE83017761	MTR—80W00022
DE83017764	BNL—33593
DE83017765	BNL—33591
DE83017766	BNL—33590
DE83017767	LBL—15751
DE83017776	DOE/ET/20279—240
DE83017777	DOE/EV/70009—T2
DE83017779	DOE/ER/10591—T1
DE83017783	NCEI—0059
DE83017784	SAND—83-0617C
DE83017785	SAND—83-0263
DE83017786	DOE/ID/12371—4
DE83017787	DOE/RG—0063
DE83017788	ONWI—486
DE83017789	ONWI—417
DE83017790	SAND—83-0950C
DE83017791	SAND—83-0609C
DE83017792	SAND—83-0611C
DE83017793	SAND—83-0564C
DE83017794	NUREG/CR—3179
DE83017795	DOE/CE/15126—T3
DE83017796	DOE/NASA/20320—30
DE83017800	SAND—83-0620C
DE83017803	DOE/ET/52040—T16
DE83017804	DOE/EV/70009—T1
DE83017805	PNL-SA—11568
DE83017809	DOE/ET/34010—9
DE83017811	SAND—83-7110
DE83017820	SAND—83-0795C
DE83017822	SAND—83-0612C
DE83017823	SAND—83-1902C
DE83017824	SAND—83-0575C
DE83017826	SAND—83-1945C
DE83017827	BNL—51599
DE83017828	UCID—19866
DE83017832	UCID—19877-Pt.1
DE83017835	UCRL—88209
DE83017836	UCRL—88916
DE83017838	LBL—14588
DE83017839	UCRL—89776
DE83017840	UCRL—89767
DE83017841	UCRL—89511
DE83017842	NUREG/CR—1246-Vol.4
DE83017843	NUREG/CR—0200-Vols.1-2-3-Bk.4
DE83017844	DOE/ID/12140—T1
DE83017845	Y/DU—301
DE83017846	DOE/IR/10430—T1
DE83017847	NUREG/CR—3404
DE83017851	DOE/ER/13019—1
DE83017852	DOE/EIA—0226(83/06)
DE83017853	NUREG/CR—0200-Vols.1-2-3-Bk.5
DE83017854	DOE/ER/02289—T3
DE83017856	CONF-830374—2
DE83017858	DOE/ET/20647—T1
DE83017860	ONWI—365
DE83017865	DOE/ER—0173
DE83017867	Y/DK—357
DE83017868	PNL-SA—11509
DE83017870	PNL-SA—11167
DE83017871	PNL-SA—11282
DE83017872	DOE/NBM—3017872
DE83017873	DOE/NBB—0040
DE83017878	DOE/CS/40341—T2
DE83017879	DOE/CS/40341—T3
DE83017880	DOE/ER—0161
DE83017881	PNL—4759
DE83017882	UCRL—53438
DE83017883	SAND—83-1283
DE83017884	BNL-NCS—51684
DE83017889	PNL-SA—11371
DE83017891	DOE/ER/01545—338
DE83017892	DOE/ER/10596—3
DE83017899	DOE/NBB—0044
DE83017902	DOE/BP—137
DE83017903	LBL—16045
DE83017905	UCID—19720
DE83017908	DOE/BP—180
DE83017909	CONF-831063—4
DE83017911	CONF-8310157—1
DE83017912	CONF-830538—18
DE83017914	CONF-830384—2
DE83017915	DOE/MC/12233—T1
DE83017917	GJBX—37(83)-Vol.1
DE83017925	CONF-831104—1
DE83017926	CONF-8308120—1
DE83017927	CONF-830847—1
DE83017929	ANL-HEP-CP—83-47
DE83017932	DOE/ER/01195—478
DE83017933	CONF-830841—15
DE83017934	DOE/EIA—0354(82)
DE83017936	CONF-831020—3
DE83017937	CONF-830795—3
DE83017938	CONF-830874—26
DE83017939	CONF-831020—2
DE83017941	CONF-831047—86
DE83017943	DOE/ET/29196—T2
DE83017945	CONF-830577—4
DE83017951	CONF-8308113—3
DE83017954	CONF-830731—1
DE83017955	CONF-830899—3
DE83017961	CONF-830816—35
DE83017962	CONF-830851—1
DE83017963	CONF-830936—2
DE83017964	CONF-8306122—1
DE83017966	DOE/ET/17093—1471
DE83017967	CONF-801144—5
DE83017968	CONF-821155—9
DE83017969	CONF-821155—13
DE83017970	CONF-801144—11
DE83017971	CONF-801144—6
DE83017973	CONF-830841—13
DE83017974	CONF-830588—4
DE83017984	PPPL—2021
DE83017985	PPPL—2020
DE83017988	UCID—19890
DE83017990	HEDL-TME—83-11
DE83017991	ANL/EES-TM—232
DE83017992	ORNL/TM—8717
DE83017993	ENICO—1134
DE83017994	SAND—83-7029
DE83017995	SAND—83-0518
DE83017996	DOE/CS/24312—7
DE83017997	PNL—4333
DE83017998	WIPP-DOE—176
DE83018000	DOE/MC/19314—1474
DE83018005	UCRL—88671
DE83018067	MLM—3089
DE83018068	SAND—83-7102
DE83018069	UCRL—53336
DE83018070	ENICO—1136
DE83018071	ONWI—197
DE83018072	DOE/EV/10402—T2
DE83018073	IS-M—456
DE83018074	IS-M—455
DE83018075	IS-M—454
DE83018076	IS-M—449
DE83018077	IS-M—450
DE83018078	IS-M—452
DE83018079	IS-M—453
DE83018080	IS-M—446
DE83018081	IS-M—445
DE83018082	IS-M—444
DE83018090	IS-M—457
DE83018091	IS-M—459
DE83018094	DOE/EV/12529—22
DE83018109	DOE/ER/12032—02
DE83018111	DOE/NBM—3018111
DE83018113	SAND—83-8029
DE83018114	NRL-MR—5184
DE83018116	NBL—307
DE83018118	DOE/ET/53043—6
DE83018120	DOE/ER/53147—1
DE83018131	DOE/ER/01195—475
DE83018197	NUREG/CR—3204
DE83018203	UNI—436
DE83018208	NUREG/CR—3397
DE83018209	HEDL—7387
DE83018210	DOE/CE/15095—3
DE83018215	DOE/CE/64832—T1
DE83018218	BNL—51575
DE83018219	SLAC-PUB—3187
DE83018220	PNL—4803
DE83018221	PNL—4844
DE83018222	PNL—4663
DE83018223	DOE/EIA—0347(82-83)
DE83018226	DOE/NBM—3018226
DE83018228	PNL—4738
DE83018230	ONWI—474

Order No.	Report No.
DE83018231	UCRL—53287
DE83018232	DOE/NASA/20320—48
DE83018233	RHO-BW-ST—19-P
DE83018235	SAND—83-1265
DE83018237	DOE/CS/20192—T3
DE83018239	DOE/ET/23089—T2
DE83018243	DOE/EIA—0397(83/1Q)
DE83018244	NUREG/CR—3269
DE83018245	DOE/EIA—0403
DE83018250	DOE/ER/10591—T2
DE83018253	NUREG/CR—3359-Vol.2
DE83018255	NUREG/CR—2238-Vol.20
DE83018256	DOE/EIA—0401(Exec.)
DE83018257	DOE/EIA—0380(83/08)
DE83018258	DOE/BP—168
DE83018259	DOE/BP—167
DE83018262	DOE/CS/50277—T2
DE83018263	SAND—83-1992C
DE83018264	SAND—83-1316C
DE83018265	ONWI—363
DE83018267	ONWI—284
DE83018271	ONWI—27
DE83018273	NUREG/CR—2482-Vol.4
DE83018275	BNL—33659
DE83018286	PNL-SA—11579
DE83018288	SAND—83-8025
DE83018297	BNL—33666
DE83018298	PNL-SA—11502
DE83018301	ORNL/TM—8227
DE83702950	INP—1106/PL
DE83702951	INS—403
DE83702952	JINR—E-1-82-285
DE83702953	JINR—E-1-82-286
DE83702954	JINR—E-1-82-287
DE83702955	JINR—E-1-82-352
DE83702956	JINR—E-1-82-517
DE83702957	JINR—R-1-81-773
DE83702958	JINR—R-1-82-393
DE83702959	JINR—R-1-82-534
DE83702960	JINR—R-15-82-173
DE83702961	JINR—R-3-82-224
DE83702962	JINR—R-3-82-303
DE83702963	JINR—R-3-82-411
DE83702964	JINR—R-3-82-436
DE83702965	OAEP—92
DE83702966	OAEP—93
DE83702967	OAEP—94
DE83702968	OAEP—96
DE83702969	RMCS-R—78005
DE83702970	RMCS-R—80001
DE83702971	UJV—6256-CH
DE83702972	PINSTECH/NCD—104
DE83702973	CERN—82-10
DE83702974	ICR—87-81-3
DE83702975	PINSTECH/HP—28
DE83702976	PINSTECH/HPD—101
DE83702977	IFVE-OI—81-125
DE83702978	IFVE-OI—81-126
DE83702979	IFVE-OI—81-173
DE83702980	IFVE-OI—82-160
DE83702981	IFVE-OP—82-130
DE83702982	IFVE-ORI—82-75
DE83702983	INS-NUMA—30
DE83702984	INS-NUMA—32
DE83702985	INS-TH—143
DE83702986	INS-TH—144
DE83702987	INS-TL—142
DE83702988	JINR—13-82-587
DE83702989	JINR—9-82-357
DE83702990	JINR—9-82-515
DE83702991	JINR—9-82-556
DE83702992	JINR—9-82-623
DE83702993	JINR-R—9-82-383
DE83702994	JINR-R—9-82-502
DE83702995	JINR-R—9-82-504
DE83702996	KEK—81-10
DE83702997	KEK—81-11
DE83702998	KEK—81-13
DE83702999	KEK—81-14
DE83703000	KEK—81-15
DE83703001	KEK—81-17
DE83703002	KEK—81-19
DE83703003	KEK—81-20
DE83703004	KEK—81-6
DE83703005	KEK—81-7
DE83703006	KFTI—82-10
DE83703007	KURRI-TR—218
DE83703008	NIIEFA-P-B—0527
DE83703009	MTB—149
DE83703010	MTB—152
DE83703011	IAE—3450/5
DE83703012	IAE—3458/5
DE83703013	IAE—3491/4
DE83703014	FEI—1299
DE83703018	IAEA-TC—389/6-10
DE83703019	IAEA-TC—389/6-11
DE83703021	IAEA-TC—389/6-14
DE83703022	IAEA-TC—389/6-15
DE83703023	IAEA-TC—389/6-16
DE83703024	IAEA-TC—389/6-17
DE83703025	IAEA-TC—389/6-2
DE83703026	IAEA-TC—389/6-21
DE83703027	IAEA-TC—389/6-24
DE83703028	IAEA-TC—389/6-25
DE83703029	IAEA-TC—389/6-26
DE83703030	IAEA-TC—389/6-3
DE83703031	IAEA-TC—389/6-4
DE83703032	IAEA-TC—389/6-5
DE83703033	IAEA-TC—389/6-6
DE83703034	IAEA-TC—389/6-8
DE83703035	IAE—3451/5
DE83703036	MTB—153
DE83703038	ITEF—69(1982)
DE83703039	CEA-CONF—6523
DE83703040	PNC-G—033-82-01(1)
DE83703041	PNC-G—033-82-01(2)
DE83703042	PNC-G—033-82-01(3)
DE83703043	PNC-G—033-82-01(4)
DE83703044	PNC-G—033-82-01(5)
DE83703045	PNC-G—033-82-01(6)
DE83703046	PNC-G—033-82-01(7)
DE83703047	PNC-N—241-81-11(3)
DE83703048	PNC-N—241-81-11(4)
DE83703049	PNC-N—241-81-11(5)
DE83703050	PNC-N—241-81-11(6)
DE83703051	PNC-N—930-80-02
DE83703052	PNC-N—930-80-03
DE83703053	PNC-N—930-80-04
DE83703054	PNC-N—930-81-01
DE83703055	PNC-N—941-81-114
DE83703056	PNC-N—941-81-115
DE83703057	PNC-N—941-81-116
DE83703058	UJV—5856-T
DE83703059	UJV—6232-T
DE83703060	JINR—R-13-82-533
DE83703061	PNC-J—260-82-01
DE83703062	CERN—82-13
DE83703063	IFVE-OEA—82-141
DE83703064	IFVE-OEF—82-149
DE83703065	IFVE-OEF—82-49
DE83703066	IFVE-OEF—82-58
DE83703067	IFVE-ONF—82-97
DE83703068	IFVE-OP—82-117
DE83703069	INS—442
DE83703070	INS-J—163
DE83703071	INS-TL—140
DE83703072	INS-TL—141
DE83703073	IPPJ-DT—89
DE83703074	ITEF—104(1982)
DE83703075	JINR—10-82-490
DE83703076	JINR—13-82-452
DE83703077	JINR—13-82-90
DE83703078	JINR—16-82-444
DE83703079	JINR—E-10-82-136
DE83703080	JINR—E-13-82-421
DE83703081	JINR—R-13-82-547
DE83703082	PNCT—841-81-56
DE83703083	ITEF—64(1982)
DE83703084	JINR—10-82-351
DE83703085	JINR—13-82-318
DE83703086	KIYI—81-41
DE83703087	CEA-CONF—6530
DE83703088	UJV—6216-CH
DE83703089	IAE—3455/3
DE83703090	PNCT—841-81-57
DE83703091	EFI—500(43)-81
DE83703092	FEI—1288
DE83703093	FEI—1300
DE83703094	IAE—3442/15
DE83703095	INS-TH—141
DE83703096	ITEF—94(1982)
DE83703097	JINR—R-10-82-304
DE83703098	JINR—R-10-82-597
DE83703099	JINR—R-11-82-459
DE83703100	KIYI—81-27
DE83703101	NIIAR—19(534)
DE83703102	NIIAR—59(512)
DE83703103	NIRS-AR—21
DE83703104	NIRS-AR—22
DE83703431	AERE-M—3251
DE83703432	ARL/TR—049
DE83703433	OEFZS—4200
DE83703434	IAEA-R—2137/F
DE83703435	IC—82/201
DE83703437	AECB—1130
DE83703439	ARL/TR—047
DE83703440	ARL/TR—048
DE83703441	ARL/TR—051
DE83703442	EHD—81-72
DE83703443	KFKI—1982-114
DE83703444	TU-Inf—05-15-80
DE83703445	TU-Inf—05-37-80
DE83703446	ZfK—490
DE83703448	KFKI—1982-111
DE83703449	KFKI—1983-09
DE83703452	CEA-N—2323
DE83703453	CEA-R—5168
DE83703454	CRN-CPR—82-17
DE83703455	EFI—499(42)-81
DE83703456	TU-Inf—05-01-81
DE83703457	TU-Inf—05-13-80
DE83703458	TU-Inf—05-14-80
DE83703459	TU-Inf—05-17-80
DE83703460	TU-Inf—05-18-80
DE83703461	TU-Inf—05-19-80
DE83703462	TU-Inf—05-20-80
DE83703463	TU-Inf—05-21-80
DE83703464	TU-Inf—05-27-80
DE83703465	TU-Inf—05-28-80
DE83703466	TU-Inf—05-29-80
DE83703468	AAEC/E—550
DE83703469	AERE-R—10599
DE83703470	CEA-CONF—6529
DE83703471	AERE-R—10665
DE83703472	CEA-N—2314
DE83703473	CEA-N—2322
DE83703474	CEA-N—2310
DE83703475	ZfK—488
DE83703476	ZfK—489
DE83703533	JINR—E-2-82-671
DE83703534	JINR—E-2-82-681
DE83703535	JINR—E-2-82-705
DE83703536	JINR—E-2-82-745
DE83703537	JINR-R—2-82-721
DE83703538	JINR-R—5-82-723
DE83703539	IAEA-R—2226-F
DE83703540	IC—82/134
DE83703541	LLB-RA—1981-82
DE83703542	CEA-CONF—6581
DE83703543	IFVE-OTF—82-125
DE83703544	JINR-R—1-82-353
DE83703545	IC—82/100
DE83703546	IC—82/149
DE83703547	CEA-CONF—6604
DE83703548	IC—82/137
DE83703549	INDC(CCP)—184/L
DE83703550	TU-Inf—05-09-80
DE83703551	INDC(NDS)—133/NE
DE83703552	INDC(NDS)—138/GE
DE83703553	INDC—37/U
DE83703554	ITEF—123(1982)
DE83703555	JINR—E-1-82-377
DE83703556	NIIAR—42(495)
DE83703557	FEI—1302
DE83703558	FEI—1307
DE83703559	JINR—18-82-558
DE83703560	IAEA-R—2616-F
DE83703561	IAEA-R—2561-F
DE83703562	IAEA-TECDOC—269
DE83703563	MS—5.8-1974
DE83703564	RISO-M—2273
DE83703565	IAEA-R—2571-F
DE83703566	CEA-CONF—6561
DE83703567	IAE—3582/5
DE83703568	IWGGCR—5

Order No.	Report No.
DE83703569	CEA-CONF—6560
DE83703570	JINR—13-82-763
DE83703571	JINR—13-82-764
DE83703572	JINR-R—15-82-706
DE83703573	JINR—E-13-82-639
DE83703574	INDC(SEC)—82/UN
DE83703575	AERE-R—10556
DE83751047	GSF-K—90
DE83751048	GRS-F—121
DE83751050	Juel—1814
DE83751052	Juel-Spez—161
DE83751053	PTB-FMRB—95
DE83751054	Juel—1809
DE83751055	HMI-B—388
DE83751056	GKSS—83/E/8
DE83751057	DESY—83-010
DE83751058	DESY—83-012
DE83751328	BMFT-FB-T—83-139
DE83751329	EIR—485
DE83770395	NP—3770395
DE83770396	NP—3770396
DE83770397	NP—3770397
DE83770398	NP—3770398
DE83770399	NP—3770399
DE83770400	NP—3770400
DE83770401	NP—3770401
DE83770402	NP—3770402
DE83770403	NP—3770403
DE83770404	NP—3770404
DE83770405	NP—3770405
DE83770406	NP—3770406
DE83770407	NP—3770407
DE83770408	NP—3770408
DE83770409	NP—3770409
DE83781079	ZfI-Mitt—60
DE83781080	ZfI-Mitt—55
DE83781082	NIRS-RSD—50
DE83781137	DESY-L-Trans—271
DE83781138	DESY-L-Trans—269
DE83781139	KFK-tr—685
DE83900904	NP—3900904
DE83902216	RISLEY-Trans—4352
DE83902682	USGS-OFR—78-926
DE83902702	NP—3902702
DE83902703	NP—3902703
DE83902753	CE-Trans—7880
DE83902786	NUREG—0925-Final
DE83902791	NP—3902791
DE83902793	MSHA/IR—1141
DE83902813	JPL-PUB—81-66-Vol.1
DE83902814	JPL-PUB—81-66-Vol.2
DE83902899	NUREG—0827-FINAL
DE83902908	Trans-WH—548
DE83902935	CONF-8108168—1
DE83902951	NP—3902951
DE83902955	MSHA/IR—1126
DE83902979	MESA-IR—1002
DE83902990	MESA-IR—1009
DE83903010	MSHA/IR—1130
DE83903011	MSHA/IR—1131
DE83903013	NP—3903013
DE83903014	NP—3903014
DE83903015	NP—3903015
DE83903016	NP—3903016
DE83903023	MSHA/IR—1142
DE83903083	USGS-OFR—78-929
DE83903090	NUREG—0580-Vol.12-No.8
DE83910802	NP—3910802
DE83910803	OTA—3910803
DE83910813	NUREG/CR—3371-Vol.2
DE83910814	NUREG/CR—3473
DE83910816	NUREG/CR—3427-Vol.1
DE83910817	TVA/OP/TSEC—82/1
DE83910818	NP—3910818
DE83910827	TVA/OP/EDT—82/54
DE83910829	NUREG/CR—3264
DE83910831	NUREG—0540-Vol.5-No.6
DE83910852	TVA/OP/EDT—83/12
DE83910862	NUREG/CR—3371-Vol.1
DE83910868	NUREG—1003
DE83910889	UT/CES-WP—6
DE83910891	NUREG/CR—3399
DE84000032	DOE/JPL/954929—83/10
DE84000053	NUREG/CR—2631
DE84000123	LA—9770-MS
DE84000172	UCRL—15548
DE84000359	UCID—19887
DE84000508	ONWI—92
DE84000509	ONWI—195
DE84000525	DOE/BC/10309—16
DE84000527	ONWI—494
DE84000541	ORNL/TM—8419
DE84000607	DOE/BC/10308—30
DE84000848	BNL—51568
DE84780005	CERN—83-02
DE84900071	NUREG—0420-

Abbreviations Used in Availability Column

EM Available in aperture card format only. Inquiries regarding the availability of these items should be addressed to USDOE-TIC, P.O. Box 62, Oak Ridge, Tennessee, 37830.

ETEC Available *only to requesters within the United States* from the Energy Technology Engineering Center, P.O. Box 1449, Canoga Park, California 91304.

GJO Available from DOE Grand Junction Office, P.O. Box 2567, Grand Junction, Colorado 81501.

GPO For sale by the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.

HMSO Her Majesty's Stationery Office, Atlantic House, Holborn Viaduct, London, England, EC1P 1BN.

NSO Available *only to requesters within the United States* from the Nuclear Standards Office, Oak Ridge National Laboratory, P.O. Box X, Oak Ridge, Tennessee 37830.

NTIS For sale by the National Technical Information Service (NTIS), U.S. Department of Commerce, Springfield, Virginia 22161. Price given is the domestic price for paper copy; prices for foreign purchasers are in most instances twice the domestic price.

TIC Available from the Technical Information Center, P.O. Box 62, Oak Ridge, Tennessee 37830.

NTIS NORTH AMERICAN PRICE CODES

Most NTIS products and services are now announced by price codes and, therefore, without specific prices in NTIS journals, newsletters and indexes.

The current dollar equivalent for each code is shown in the schedule below. Orders must list the accession number(s) and be accompanied by the total dollar amount from the current schedule.

NORTH AMERICAN CONTINENT PRICE SCHEDULE

Customers in Canada, United States, and Mexico please use this price schedule; other addressees, write for Folder PR-360-4.

MICROFICHE					
A01	$4.50	E01	$6.50	T01	$125.00
PAPER COPY		E02	7.50	T02	140.00
A02	7.00	E03	9.50	T03	240.00
A03	8.50	E04	11.50	T04	320.00
A04	10.00	E05	13.50	T05	400.00
A05	11.50	E06	15.50	T06	465.00
A06	13.00	E07	17.50	T07	530.00
A07	14.50	E08	19.50	T08	595.00
A08	16.00	E09	21.50	T09	660.00
A09	17.50	E10	23.50	T10	725.00
A10	19.00	E11	25.50	T11	790.00
A11	20.50	E12	28.50	T12	855.00
A12	22.00	E13	31.50	T13	920.00
A13	23.50	E14	34.50	T14	985.00
A14	25.00	E15	37.50	T15	1,050.00
A15	26.50	E16	40.50	T16	1,115.00
A16	28.00	E17	43.50	T17	1,180.00
A17	29.50	E18	46.50	T18	1,245.00
A18	31.00	E19	51.50	T19	1,310.00
A19	32.50	E20	61.50	T99	**
A20	34.00	E99	**		
A21	35.50	N01	35.00		
A22	37.00	N02	40.00		
A23	38.50				
A24	40.00				
A25	41.50				
A99	*				

*Add $1.50 for each additional 25-page increment, or portion thereof.
**Contact NTIS for price quote.

PRICES EFFECTIVE JANUARY 1, 1983

U.S. DEPARTMENT OF COMMERCE
National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

CODES USED ON INDEX LINES

Following the citation numbers in the Corporate Author, Personal Author, and Subject Indexes, codes are used to designate the type of document, country of publication, and language of the document, e.g., (R:SU:In Russian). The language designator does not appear if the document is published in English.

DOCUMENT TYPES

J	Journal article
TJ	Translation of a journal article
R	Report
RA	Report analytic
B	Book
BA	Book analytic
P	Patent
E	Engineering materials
D	Thesis or dissertation
TG	Translation (general)
TA	Translation (analytic)

COUNTRY CODES

AD	Andorra
AE	United Arab Emirates
AF	Afghanistan
AL	Albania
AR	Argentina
AT	Austria
AU	Australia
BB	Barbados
BD	Bangladesh
BE	Belgium
BG	Bulgaria
BH	Bahrain
BI	Burundi
BM	Bermuda
BO	Bolivia
BR	Brazil
BS	Bahamas
BT	Bhutan
BU	Burma
BW	Botswana
BY	Byelorussian Soviet Socialist Republic (Byelorussian SSR)
CA	Canada
CB	Khmer Republic
CE	Ceylon
CF	Central African Republic
CG	Congo
CH	Switzerland
CI	Ivory Coast
CL	Chile
CM	United Republic of Cameroon
CN	China
CO	Columbia
CR	Costa Rica
CS	Czechoslovakia
CU	Cuba
CY	Cyprus
DD	German Democratic Republic
DE	Germany, Federal Republic of (F.R. Germany)
DK	Denmark
DO	Dominican Republic
DY	Dahomey
DZ	Algeria
EA	European American Committee Reactor Physics
EC	Ecuador
ED	European American Nuclear Data Committee
EG	Egypt
ER	European Space Research Organization
ES	Spain
ET	Ethiopia
EU	European Company for the Chemical Processing of Irradiated Fuels
FI	Finland
FJ	Fiji
FR	France
GA	Gabon
GB	United Kingdom of Great Britain and Northern Ireland (UK)
GD	Grenada
GH	Ghana
GM	Gambia
GN	Guinea
GQ	Equatorial Guinea
GR	Greece
GT	Guatemala
GW	Guinea-Bissau
GY	Guyana
HK	Hong Kong
HN	Honduras
HT	Haiti
HU	Hungary
HV	Upper Volta
IA	Inter-American Nuclear Energy Commission
IB	International Bank for Reconstruction and Development
ID	Indonesia
IE	Ireland
IG	Inter-Governmental Maritime Consultative Organization
II	International Commission on Radiation Units and Measurements
IL	Israel

IN India
IO International Labor Organization
IP International Union of Pure and Applied Physics
IQ Iraq
IR Iran
IS Iceland
IT Italy
IX International Union of Pure and Applied Chemistry

JM Jamaica
JO Jordan
JP Japan

KE Kenya
KH Cambodia
KP Democratic People's Republic of Korea
KR Korea, Republic of
KW Kuwait

LA Laos
LB Lebanon
LI Liechtenstein
LK Sri Lanka
LR Liberia
LS Lesotho
LU Luxembourg
LY Libyan Arab Republic

MA Morocco
MC Monaco
MG Madagascar
ML Mali
MN Mongolia
MR Mauritania
MT Malta
MU Mauritius
MV Maldives
MW Malawi
MX Mexico
MY Malaysia

NE Niger
NG Nigeria
NI Nicaragua
NL Netherlands
NO Norway
NP Nepal
NR Nauru
NZ New Zealand

OE Organization for Economic Cooperation and Development
OM Oman

PA Panama
PE Peru
PG Papua New Guinea
PH Philippines
PK Pakistan
PL Poland
PR Puerto Rico
PT Portugal
PY Paraguay

QA Qatar

RH Southern Rhodesia
RO Romania
RW Rwanda

SA Saudi Arabia
SD Sudan
SE Sweden
SG Singapore
SK Sikkim
SL Sierra Leone
SM San Marino
SN Senegal
SO Somalia
SU Union of Soviet Socialist Republics (USSR)
SV El Salvador
SY Syria
SZ Swaziland

TC Trucial Oman
TD Chad
TG Togo
TH Thailand
TN Tunisia
TO Tonga
TR Turkey
TT Trinidad and Tobago
TW Taiwan
TZ United Republic of Tanzania

UA Ukrainian Soviet Socialist Republic (Ukrainian SSR)
UE United Nations Educational, Scientific and Cultural Organization
UF United Nations Children's Fund
UG Uganda
UI United Nations Industrial Development Organization
US United States of America (USA)
UY Uruguay

VA Holy See
VD Democratic Republic of Viet-Nam
VE Venezuela
VS Republic of Viet-Nam

WM World Meteorological Organization
WS Western Samoa

XA International Atomic Energy Agency (IAEA)
XC European Organization for Nuclear Research (CERN)
XE Commission of the European Communities (CEC)
XF Food and Agriculture Organization of the United Nations (FAO)
XJ Joint Institute for Nuclear Research (JINR)
XM Council for Mutual Economic Assistance (CMEA)
XN Nuclear Energy Agency of the OECD (NEA)
XO Organization of African Unity (OAU)
XR International Commission on Radiological Protection (ICRP)
XS International Organization for Standardization (ISO)
XU United Nations (UN)
XW World Health Organization (WHO)
XX World Energy Conference (WEC)

YD Democratic Yemen
YE Yemen
YU Yugoslavia

ZA South Africa
ZM Zambia
ZR Zaire

* U.S. GOVERNMENT PRINTING OFFICE: 1983-746-063:13

Cut out appropriate form and mail in a stamped envelope to the address indicated.

Change of Address Form

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

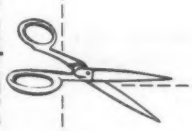
PLEASE PRINT OR TYPE

(or) COUNTRY

Mail this form to:

NEW ADDRESS
Superintendent of Documents
Government Printing Office SSOM
Washington, D.C. 20402

Attach last subscription label here.



Subscription Order Form

SUBSCRIPTION ORDER FORM

ENTER MY SUBSCRIPTION TO:

@ $ Domestic; @ $ Foreign.

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

☐ Remittance Enclosed (Make checks payable to Superintendent of Documents)

☐ Charge to my Deposit Account No. .....

MAIL ORDER FORM TO:
Superintendent of Documents
Government Printing Office
Washington, D.C. 20402

AVAILABILITY OF REFERENCES ABSTRACTED

REPORTS

Most reports abstracted in this publication may be obtained from

National Technical Information Service (NTIS)
5285 Port Royal Road
Springfield, VA 22161

or

DOE Technical Information Center (TIC)
P. O. Box 62
Oak Ridge, TN 37830
ATTN: Customer Services Division

Note: DOE offices and contractors should order from TIC; all others should order from NTIS. For more specific information on ordering, please note the introductory paragraph to the Report Number Index. For assistance in obtaining reports that do not have an Order No. (DE...) or other availability indicated in the citation or Report Number Index, contact TIC.

PATENTS

Although not cataloged as reports, patents cited from each country are listed in the Report Number Index under PATENTS-AU, PATENTS-FR, PATENTS-US, etc. U. S. Patent Applications, e.g., A 293,415, are available from NTIS.

NON-REPORT DOCUMENTS

Check the citation closely for the availability of such documents as journal articles, conference papers, books, and monographs. It may be necessary to request directly from the publisher or originator or to contact local, state, or university libraries or commercial reprint services.

Dissertations are available from University Microfilms International, Dissertation Copies, P. O. Box 1764, Ann Arbor, MI. Please request by Order No., e.g., DA82-11997.

OTHER

When GPO is cited as available source, order from Superintendent of Documents, Government Printing Office, Washington, D. C. 20402.

REPORT COLLECTIONS

The libraries listed below purchase and maintain microfiche collections of DOE and foreign reports. Most of these libraries have microfiche reader-printers or other photocopy facilities with which to reproduce enlarged copies from microfiche. Charges for reproduction services vary.

United States

ARIZONA
Tucson, University of Arizona

CALIFORNIA
Davis, University of California
Los Angeles, University of California
Santa Barbara, University of California

COLORADO
Boulder, University of Colorado

DISTRICT OF COLUMBIA
Washington, Library of Congress

FLORIDA
Gainesville, University of Florida

GEORGIA
Atlanta, Georgia Institute of Technology

ILLINOIS
Urbana, University of Illinois

INDIANA
Lafayette, Purdue University

KANSAS
Manhattan, Kansas State University

KENTUCKY
Lexington, University of Kentucky

LOUISIANA
Baton Rouge, Louisiana State University

MARYLAND
College Park, University of Maryland

MASSACHUSETTS
Cambridge, Massachusetts Institute of Technology

MISSISSIPPI
Mississippi State, Mississippi State University

MISSOURI
Columbia, University of Missouri
Kansas City, Linda Hall Library

NEBRASKA
Lincoln, University of Nebraska

NEW JERSEY
Princeton, Princeton University

NEW MEXICO
Albuquerque, University of New Mexico

NEW YORK
Albany, New York State Library
Ithaca, Cornell University
New York, Columbia University
Rochester, University of Rochester

NORTH CAROLINA
Raleigh, North Carolina State University

OHIO
Cincinnati, University of Cincinnati
Cleveland, Cleveland Public Library

OKLAHOMA
Norman, University of Oklahoma

PUERTO RICO
San Juan, University of Puerto Rico

SOUTH CAROLINA
Columbia, University of South Carolina

TEXAS
Austin, University of Texas
College Station, Texas A & M University
Houston, Rice University

UTAH
Salt Lake City, University of Utah

WASHINGTON
Pullman, Washington State University
Seattle, University of Washington

WISCONSIN
Madison, University of Wisconsin

International

EUROPEAN ATOMIC ENERGY COMMUNITY (EURATOM)
Brussels, Belgium
Ispra, Varese, Italy, Cetis Library

INTERNATIONAL ATOMIC ENERGY AGENCY (IAEA)
Vienna, Austria

OECD NUCLEAR ENERGY AGENCY (NEA)
British Library Lending Division
Boston Spa, Wetherby, Yorkshire, England

UNITED STATES DEPARTMENT OF ENERGY
P.O. BOX 62
OAK RIDGE, TENNESSEE 37830

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE. $300

POSTAGE AND FEES PAID
UNITED STATES
DEPARTMENT OF ENERGY

3227 FS- 1
UNIVERSITY MICROFILMS INTERNATIONAL
ATTN SERIALS PROCESSING
300 NORTH ZEEB RD
ANN ARBOR, MI 48106

DOE/RECON SYSTEM

COMPUTER SEARCH SERVICE

DOE/RECON is an interactive on-line information retrieval system developed to provide rapid and easy access to energy-related data bases. The acronym RECON stands for REmote CONsole, which signifies that the system can be accessed by users located at various sites across the United States.

The system permits users to carry on a dialogue with the computer. This dialogue allows browsing through large data bases and can result in retrieval of citations which answer specific needs. Desired information can be selectively retrieved via simple yet powerful commands sent to the computer from the terminal keyboard.

Search logic may be formulated by the use of indexed terms, such as keywords, authors, categories, or corporate authors. As the search session progresses, AND, OR and NOT Boolean logic may be used to improve precision, i.e., the specificity of the retrieved set. For most data bases, the user may limit the scope of the search to particular years or volumes of data. Upon completion of a search, the user may choose to have the results displayed or printed at his/her terminal or to have the results printed and mailed the following day.

The DOE/RECON system is supported by dual IBM 370/3033 computers. Two IBM 3705 front-end communications computers are used to perform the message switching. Although most of the 40 data bases are bibliographic in content, DOE/RECON is not limited to this type; the Research in Progress (RIP) data base is one that is non-bibliographic. Presently, over 2 million references are available.

Requests for information concerning authorization to access the DOE/RECON system should be addressed to:

Thomas D. Sample
Technical Information Center
U. S. Department of Energy
P. O. Box 62
Oak Ridge, TN 37830